

HANDICAPPED HOMEMAKERS

**U. S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Office of Vocational Rehabilitation
Washington 25, D. C.
May 1954**

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H A N D I C A P P E D H O M E M A K E R S

PROCEEDINGS

LEADER'S WORKSHOP ON PRINCIPLES OF WORK SIMPLIFICATION
APPLIED TO PROBLEMS OF PHYSICALLY HANDICAPPED HOMEMAKERS

June 14 - 20, 1953

University of Connecticut
Storrs, Connecticut

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Sponsored by:

SCHOOLS OF HOME ECONOMICS, BUSINESS ADMINISTRATION AND PHYSICAL THERAPY
UNIVERSITY OF CONNECTICUT

* * * *

In Cooperation With:

Connecticut Heart Association

Connecticut Society for Crippled Children and Adults

School of Nursing, University of Connecticut
School of Physical Education, University of Connecticut
Division of University Extension
University of Connecticut

Bureau of Vocational Rehabilitation
(Connecticut State Department of Education)

U.S. Department of Health, Education, and Welfare
(Office of Vocational Rehabilitation)

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U.S. Department of Health, Education, and Welfare
Office of Vocational Rehabilitation
Washington 25, D. C.

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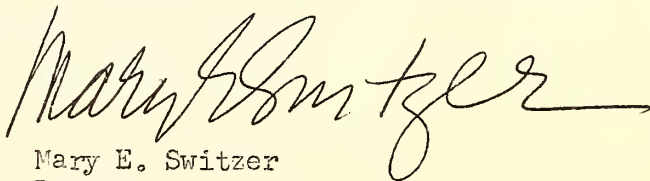
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FOREWORD

This is a report of a seven-day conference on "work simplification" for physically handicapped homemakers. The special problems of disabled homemakers cause serious social strains. The broken home, delinquency and dependency are frequent by-products of failure to deal with these situations. The tremendous number of disabled homemakers emphasizes the need for progress in this area. Ten million women in the United States are permanently handicapped to some degree by accident or illness according to an estimate made by Dr. Howard A. Rusk, Chairman of the Department of Physical Medicine and Rehabilitation, New York University-Bellevue Medical Center, New York City. Among these are 759,000 with orthopedic difficulties, 175,000 with tuberculosis and 4,000,000 cardinals.

Information of record about work simplification for disabled homemakers has been scarce and scattered. This report brings together information and experience not readily available elsewhere. Many of the 65,000 rehabilitants served by the public vocational rehabilitation program are disabled homemakers. So, this material should be useful to State rehabilitation workers. Broader concepts of the needs of their homemaking clients and sharper orientation to means of meeting these needs lie in the text of this publication and its rich appendix. The many public and volunteer workers in allied fields who provide important services for handicapped homemakers will also find it helpful for the same reasons. Finally, communities interested in studying and resolving the complex problem of disabled homemakers will find in this publication valuable guides for charting the way.

We are deeply indebted to the Dean of the University of Connecticut School of Home Economics, Mrs. Elizabeth Eckhardt May, for initiating the idea of the workshop and guiding it all along the way. Our thanks, too, go to her excellent corps of co-workers, and to the consultants and lecturers, and especially to that noted pioneer on work simplification, Dr. Lillian Gilbreth, for the inspiration of this meeting and their splendid contributions. Miss Mary Rokahr carried the major editorial burden for this publication, assisted by workshop staff and consultants, Miss Callaghan, Miss Johnston, Mrs. Judson, and Dr. Smalley.


Mary E. Switzer
Director

WORKSHOP STAFF, CONSULTANTS, AND LECTURERS

Resident Staff

Mrs. Elizabeth Eckhardt May Coordinator
Dean, School of Home Economics, University of Connecticut (1)
Harold E. Smalley Chairman, Programs & Photography
Supervisor, Motion and Time Study Laboratory, School of Business
Administration, University of Connecticut (1,3)
Miss Betty Jane Johnston Chairman, Publicity & Recorder
Instructor, School of Home Economics, University of Connecticut (1,3)
Miss Jane Callaghan, Consultant on Kitchen Planning, New York City (2,3)
Mr. A. D. Joseph Emerzian, Assistant Professor of Industrial Administration,
School of Business Administration, University of Connecticut (3)

Consultants and Lecturers


Dr. John C. Allen, Chief of Physical Medicine and Rehabilitation, Hartford
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Miss Elizabeth Bogert, Instructor in Physical Education, University of
Connecticut (2)
Horace A. Brown Chairman, Exhibits & Library
Executive Director, Connecticut Heart Association (1,4)
Mrs. Ruth Clark, State Home Demonstration Leader, University of Connecticut
(2,4)
Edward P. Chester Chairman, Finance Committee
Bureau Chief, Bureau of Rehabilitation, State Department of Education (1,4)
Carlson E. Crane Business Manager
Asst. Director, Extension & Summer Session, University of Connecticut (1)
Miss Eloise Davison, Home Econ. Cons., Hill & Knowlton, Inc. New York City (2)
Miss Josephine Dolan Chairman, Hospitality Committee
Assistant Professor of Nursing, University of Connecticut (1)
Dr. Lillian M. Gilbreth, Consulting Engineer (2,5)
Mrs. Julia S. Judson, Coordinator, Disabled Homemakers Research Project,
New York University--Bellevue Medical Center, New York City (2,5)
Mrs. Marjorie Symons Lord, Home Demonstration Agent, Middlesex County (5)
Miss Gertrude Norcross Chairman, Special Programs
Executive Secretary, Connecticut Society for Crippled Children & Adults (1,4)
Dr. L. L. Parrish, Head, Department of Industrial Administration,
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Vlad F. Ratay, Regional Representative, Office of Vocational Rehabilitation
U. S. Department of Health, Education, and Welfare (1,2)

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- 1/ Planning Committee
 - 2/ Consultant
 - 3/ Resident Staff
 - 4/ Discussion Leader
 - 5/ Visiting Lecturer

Miss Mary Rokahr, Assistant to the Chief, Division of Home Economics Programs,
U. S. Department of Agriculture (5)
Dr. Samuel A. Schuyler, Assistant Chief of Physical Medicine and Rehabilitation,
Rocky Hill Home and Hospital for Chronically Ill and Veterans' Hospital (2,4)
Miss Anna Lord Strauss, New York City (2)
Miss Frances Tappan Chairman, Invitation Committee -
Head, School of Physical Therapy, University of Connecticut (1)



Leaders preview one of the films made for the Workshop:
Dr. Lillian M. Gilbreth, Consulting Engineer;
Dr. Elizabeth Eckhardt May, Dean, School of Home Economics
University of Connecticut and Coordinator of the Workshop;
Miss Jane Callaghan, Kitchen Planning Consultant, New York City;
Harold E. Smalley, Supervisor, Motion and Time Study Laboratory,
School of Business Administration, University of Connecticut.



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PURPOSE AND PLAN FOR THE WORKSHOP

Elizabeth Eckhardt May

Dean, School of Home Economics, University of Connecticut
and Coordinator for the Workshop

The workshop was a pilot project designed to acquaint leaders concerned with the problems of homemakers with various types of disability, with some of the principles, tools and techniques of work simplification as used in industry and their application to household tasks. Inspiration for the Workshop and guidance in carrying out the plans came from Dr. Lillian Gilbreth who with her husband the late Dr. Frank Gilbreth, pioneered in the application of principles of motion and time study to production problems in industry.

Sponsorship of the Workshop was as unique as was its purpose; although the direct responsibility of three schools of the University, (Home Economics, Business Administration, and Physical Therapy), the Workshop included as working partners the Connecticut Heart Association; The Connecticut Society for Crippled Children and Adults; The Connecticut State Department of Education, Bureau of Vocational Rehabilitation; the Department of Vocational Rehabilitation of the U. S. Department of Health, Education and Welfare; and the University Schools of Nursing and Physical Education.

The general pattern for each day of the Workshop included a lecture,^{1/} well illustrated by films and slides, two sessions in the Motion and Time Study Laboratory and an additional Laboratory period in the Home Management Houses and Equipment Laboratory of the School of Home Economics.

Headquarters for the Workshop was in the Motion and Time Study Laboratory of the School of Business Administration of the University with Harold E. Smalley, Supervisor of the Laboratory, serving as chairman for the instructional program. Other members of the full time instructional staff included A. D. Joseph Emerzian from the Department of Industrial Administration of the School of Business Administration, University of Connecticut; Jane Callaghan, Kitchen Planning Consultant, from New York City; and Betty Jane Johnston, Assistant Professor of Home Management, from the School of Home Economics, University of Connecticut. Part-time staff included twelve visiting lecturers and discussion leaders from state and national organizations concerned with various aspects of the program.^{2/}

^{1/} See detailed program p. 23

^{2/} See complete list, staff and consultants p. iv

A listing of some of the topics of lectures and laboratories will give an idea of the character of the Workshop: Philosophy of Work Simplification and Methods of Study, Principles of Motion Economy, Study of Original and Improved Methods of Work, Man Analysis, Operation Analysis, Multi-activity Analysis, Techniques of Film Analysis, Storage and Work Centers, Kitchen Layout, Labor Saving Devices Adapted to Needs of the Handicapped, Adjustment of Kitchen Equipment to the Specific Needs of the Handicapped.

Nearly three-fourths of the time in the six-day Workshop was spent in the laboratory work and there was no "make believe" in the applications of work simplification principles since handicapped homemakers were available for demonstrations. These included a wheelchair patient, one with long leg braces, another on crutches, a woman with a serious cardiac condition and two women who had each lost an arm, but demonstrated that one arm is really all that is necessary for an effective job in homemaking. Miss Gertrude Norcross, Executive Secretary for the Connecticut Society for Crippled Children and Adults cooperated in bringing women to the laboratory. Demonstrations were under the expert direction of Mrs. Julia Judson, Coordinator of the Disabled Homemakers Research Project, Department of Physical Medicine and Rehabilitation, New York University--Bellevue Medical Center, New York City, Miss Callaghan and Miss Johnston.

Demonstrations were conducted in the Home Management houses and equipment laboratories of the School of Home Economics and in a portable adjustable kitchen constructed especially for the Workshop by the Connecticut Heart Association under the direction of its executive, Mr. Horace A. Brown with Miss Callaghan serving as a consultant. The kitchen, of light weight construction, can be folded to fit into a small trailer. The property of the Heart Association, it is available to Connecticut groups for leadership training and teaching purposes.

Six months before the time of the Workshop, the staff launched an ambitious movie production program illustrating Principles of Work Simplification Applied to Household Tasks. According to Mrs. Gilbreth this was the first time such pictures had been attempted. These motion pictures served as excellent teaching devices during the workshop and are now available on a low rental basis.^{3/}

Months in advance of the workshop bibliographies were compiled and publications were gathered for the Workshop library and exhibit room. National agencies, schools and colleges cooperated generously in contributing and lending publications and exhibits. A few of these have been reproduced in the report.^{4/}

^{3/} See complete list and procedure for ordering p. 31

^{4/} See list of publications p. 35

Applications for admission to the workshop were far in excess of the limit of thirty set by the staff. Preference went to Connecticut leaders who were admitted at a nominal fee. Registrations finally included leaders from the fields of home economics, physical therapy, occupational therapy, and medicine and nursing as well as representation from colleges and universities outside of the State, and several national health, welfare and youth organizations.^{5/}

Because of the need for concentrated effort on the part of workshop participants, visitors were not admitted except on the last two days when a special program was arranged.^{6/}

Homemakers will always be indebted to Mrs. Gilbreth for her special contribution in relating motion and time study to problems of homemaking. As early as 1927 she published one of the first books in this area, "The Homemaker and Her Job". In more recent years, Mrs. Gilbreth has continued her contacts with industry, but has broadened the application of principles of work simplification to include the work of librarians, the homemaking problems of cardiac patients (with the "Heart Kitchen" as a result), the activities of dietitians, nurses, and hospital administrators, and more recently, the work of homemakers with physical disabilities.

In her workshop lectures, Mrs. Gilbreth repeatedly emphasized the point that whatever is good for handicapped persons is very likely to be good for the normal person. She urged workshop participants to remember always that "time and energy are our most precious gifts and should never be wasted. The future of us all lies in the capacity of all of our people. Those with physical disabilities have great potentialities which may be realized to a fuller degree if we can enlist the skill and cooperation of all of the agencies concerned."

^{5/} See list of participants enrolled p. 20

^{6/} See list of registered visitors along with visitors day program p. 26

MOTION AND TIME STUDY APPLIED TO HOMEMAKING

Summary of Workshop Lectures and Laboratories

Prepared by Harold E. Smalley and Betty Jane Johnston

Introduction

Motion study is a method of determining how the work is to be done. It is descriptive and qualitative in nature; it is a systematic way of finding the easiest, quickest, least fatiguing, most economical method of performing work.

It has as its ultimate objective the establishment of a "one best way" of performing the work. The "one best way" is a figure of speech which denotes the optimum manner of performing an operation under present conditions at the present time in the opinion of a particular analyst. At some other time, or under some other conditions, or in the opinion of someone else, an even better method might be found. No matter how much a job, a method, a procedure, or a product is improved, room for improvement still exists.

Motion study also includes the philosophy of methods improvement, possibility guides, and classes of change.

Classes of Change. The "possibility guide" is a blank tabular form used to record all possible changes in a given method for performing a given operation. Changes were classified into these categories: 1. Changes in hand and body motions. 2. Changes in tools, workplace, and equipment. 3. Changes in process. 4. Changes in product. and 5. Changes in raw material. A job may be improved at any one of these levels.

The principles of motion economy may be applied to any type of work. Although all cannot be applied to every operation, they form a basis or code for improving efficiency and reducing fatigue in manual work.

Motion study can be broken down into two major divisions, pencil and paper motion study and micromotion study. In pencil and paper motion study, four major types of process charts were studied by the workshop group; product analysis, man analysis, operation analysis and multi-activity analysis.

Definitions of Terms and Laboratory Practice in Motion and Time Study:

Product Analysis, as the name implies, is the study of the flow of a specific product as it passes through a series of operations from one stage of completion to another. A film made by the University of Connecticut in

preparation for the Workshop^{1/} showed the movement of sheets and pillow cases as they arrived from the laundry, their storage in the linen closet, and later their distribution to the bedrooms where the beds were stripped and the soiled sheets gathered to be sent to the laundry.

As a laboratory experience a product analysis chart of preparing and serving coffee was made, tracing ingredients and utensils from the time they were taken from storage through the various operations until they were on the coffee table ready to be served. Symbols representing operations, movement, controlled and temporary storages, quantitative and qualitative inspections were used in charting this type of analysis.

Man Analysis graphically portrays the activities of a worker who moves from place to place in performing his duties; for example, the worker who moves from one work center to another in preparing coffee, or the worker who moves from room to room stripping beds and putting out clean linen.

The man analysis chart uses symbols representing operations, movements, delays, quantity and quality inspections. The path of the worker can also be shown on a floor plan by the use of a flow diagram. This involves drawing lines indicating the path the worker uses.

Operation Analysis was the next type used. In man or product analysis, the man or product is followed from place to place by the analyst. When an activity occurs, the operation symbol is used. Operation analysis magnifies and studies the detail of the operation itself. In other words, the analyst studies the operation to see what the worker did at the counter, the table or the workbench.

The operation chart breaks down the work performed by each of the body members engaged in the task. This usually means the right and left hands. When other body members such as the knee, the foot, or the eyes are important factors in the operations, they may also be charted. Sub-operations, movements, holds and delays are represented by symbols. A right and left hand operation was charted in the laboratory by using the demonstration of preparing frozen lemonade.

Multi-activity Analysis is used in work where there is interdependence between people, or between persons and machines. There are five general types; man and machine, man and multi-machine, multi-man and machine, and multi-man and multi-machine. For example, homemaker operating an ironer represents a man and machine activity, a homemaker operating an automatic washer and an automatic dryer at the same time represents a man and multi-machine activity, or two people washing and wiping dishes together represent multi-man activity.

Micromotion Study is a technique that utilizes the motion picture camera and a timing device. The motion picture film provides a means of obtaining as much detail as desired and possesses a greater accuracy than any of the pencil and paper techniques. It provides a permanent, complete record of the method

^{1/} See page 32 for complete list.

used in performing a job. The use of a timing device provides a permanent record on the film of the time involved for each step of the job.

A detailed breakdown may be made from the film. This involves analyzing the activities of the right and left hands using the elements of motion (called therbligs)^{2/} which are common to all human activity.

Each therblig, or element of motion, is represented by a different color and charted on a simochart or a film analysis chart and by looking at the colors a trained analyst can get much information about the nature of the job he is studying. For example, reds and blues mean productive work and should, of course, be predominant. Grays and black represent the hesitant therbligs such as search and select. If the chart is predominantly yellow and brown, there are too many delays and holds. Film analysis was demonstrated in the workshop laboratory by films showing two methods of transferring eggs from a carton to a container for refrigerator storage. These films were analyzed by using the microchronometer as the timing device. This instrument, developed by the Gilbreths, measures time in a basic unit of 1/2000 of a minute; or what is commonly termed a "wink".

Memomotion study is desirable for many operations, making it possible to record a job of fairly long duration with low film cost. Memomotion study films produced at Purdue University were shown in the laboratory. For research work where very careful control of time intervals is necessary, an electric motor-driven camera may be used. This camera takes pictures at 1000 frames per minute which is slightly faster than normal speed (16 frames per second or 960 per minute). If a frame counter is used, each frame of film equals 1/1000 of a minute or 2 winks.

Films produced by the University of Connecticut^{3/}. The pioneer attempts to visualize the application of motion study principles to homemaking through films resulted in eight films being produced that vary from 7 minutes to 35 minutes in length. These films are not presented as a professionally finished product, but they do visualize the following principles and topics.

THE CIRCULAR WORKPLACE
HOUSEHOLD BODY MECHANICS
PHYSICALLY HANDICAPPED
WOMEN KEEPING HOUSE
PRODUCT ANALYSIS IN THE HOME

CLASSES OF CHANGE IN THE HOME
MEET THE THERBLIGS
PRINCIPLES OF MOTION ECONOMY
IN THE HOME
TRANSFERRING EGGS (FOR FILM ANALYSIS)

^{2/} This word, coined by the Gilbreths, is actually the family name spelled backwards.

^{3/} See page 31 for complete description and method of ordering.

LABORATORY PROGRAM OF MOTION AND TIME STUDY APPLIED TO HOMEMAKING

The laboratory programs taking place in the motion and time study laboratory and in the home management houses were carefully planned so that workshop leaders would learn of the principles and then follow with application. Films were also used in providing this information. In general, the following demonstrations and films were used for these purposes:

<u>PURPOSE - To Demonstrate:</u>	<u>LABORATORY DEMONSTRATION AND FILMS</u>
1. Some of the homemaking problems of the handicapped.	Film on "Physically Handicapped Women Keeping House". Laboratory work in the adjustable portable kitchen.
2. Classes of change applied to homemaking.	Film on "Classes of Change".
3. Principles of motion economy.	Film on "Principles of Motion Economy Applied to Homemaking" which demonstrates right and wrong use of principles. Laboratory work: Experimentation with ironing.
4. Product analysis and process charting.	Laboratory work: Making coffee.
5. Man analysis.	Film on "Making rolls - Home Jobs for Man Analysis".
6. Operation analyses - right and left hand movements.	Laboratory Work: Making lemonade, spreading cheese on crackers, setting out cups and other dishes.
7. Body posture.	Film on "Household Body Mechanics". Laboratory Work in adjustable portable kitchen.
8. Home layout - maximum and minimum reach.	Films on "Circular Work Space", "Within Your Reach", and "Heart of the Home". Laboratory work in home management house and adjustable portable kitchen.
9. Multi-activity analysis time management.	Film - "Cooking and Planning".
10. Therbligs	Film - "Meet the Therbligs".

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|---|---|
| 11. Micromotion film analysis. | Film - "Transferring Eggs - A Film for Film Analysis". |
| 12. Memomotion. | Film - "A Study of Kitchen Work". |
| 13. Labor-saving devices. | Laboratory Work: Use of equipment by physically handicapped. |
| 14. Characteristics of a good kitchen plan. | Laboratory work in adjustable-portable kitchen. Making of scale models. Use of socio-drama. |
| 15. Planning and evaluating kitchen layout. | Evaluation using Illinois Kitchen Planning Standards ^{4/} |

EXHIBITS

Exhibits of materials, pictures, and equipment used in education work with physically handicapped homemakers were displayed by the following organizations and agencies:

American Foundation for the Blind - A wide variety of useful kitchen devices for the blind such as: Labels for canned goods and recipe cards written in Braille, a gauge for cutting pies, and other pieces of small equipment.

Connecticut Heart Association - The major contribution of the Connecticut Heart Association to the Workshop was the loan of a full size adjustable-portable demonstration kitchen, designed by Horace A. Brown, Executive Director of the Association, and Jane Callaghan, Workshop Consultant, and built by Billings Signs, Windsor, Connecticut. It consisted of a series of twelve 4 ft. wall panels, two of them with door openings which can be arranged to reproduce any size kitchen commonly found in a home. Window frames and wall cabinets suspended from hooks can be hung wherever needed. Models of range, refrigerator and single and double sink of heavy cardboard construction and cabinets were made of plywood for both wall and base cupboards. Two heights of sub-bases were provided to alter cabinet heights. Tables and chairs were put on swivels to facilitate raising and lowering.

Cabinets and appliances were hinged to fold flat for transportation and yet lock in place when in use. The entire unit, both walls and equipment, was brought to the University on a small camp trailer towed by a sedan. Two arrangements of a 9' x 12' kitchen were shown during the workshop. Plans are underway for the various chapters of the Heart Association to use the mock-up kitchen throughout Connecticut in connection with their Heart of the Home Program for Cardiacs. A scale model of the Heart Kitchen, made by a manual training class, which has been used in connection with the Heart of the Home Program was also exhibited.

^{4/} See page 38 for the references.

Girl Scouts of America - Pictures and printed material relevant to homemaking training for Girl Scouts.

Hartford County Rehabilitation Workshop of the Connecticut Society for Crippled Children and Adults - A group of utensils used in the developing of kitchen skills.

Ingenuity Unlimited - A special typewriter designed for use with one hand with a Dvorak simplified keyboard.

Institute of Physical Medicine and Rehabilitation of the New York University - Bellevue Medical Center - Pictures showing facilities for homemaking such as wheelchair for energy saving, and a collection of small kitchen tools for the use of the one-handed.

National Safety Council, Inc. - Numerous pamphlets and posters illustrating safety measures and devices for the home.

Connecticut Rocky Hill Hospital for the Chronically Ill - A selection of self-help devices accompanied by photographs showing how they are used.

U.S. Department of Agriculture - Pictures depicting the marriage cycle and work simplification material currently in use by extension specialists.

Commercial Companies - cooperated by furnishing equipment that was used in laboratory work and by the physically disabled:

Bendix Corporation - Combination washer and dryer.

Proctor Electric Company - Ironing boards and irons.

Connecticut Light and Power Company - Universal Modular Electric Range.

EXCERPTS FROM TALKS MADE DURING THE WORKSHOP

Dr. Lillian M. Gilbreth, Consulting Engineer, who spoke several times during the workshop, made these concluding remarks: "Problems in work simplification faced in the past have not been easy ones. They led to the invention, development and adaptation of the techniques - the process chart, the micromotion film and the therbligs. They also led to an increased emphasis on the human element - the man or woman on the job. Through all the years the work with the physically disabled has proved most rewarding. Their courage, competence and willingness to share the results of their efforts to do more and better work have been a challenging example. The future will find us working to maintain what has been done and to extend our field of usefulness.

"We realize that our responsibilities include education, evaluation, adaptation, application and emphasis on participation and appreciation. We must never stop asking questions. What are we working for? Why? What are our resources? Here are a few of our answers. We want creative activity for everyone within and outside the home. We want to develop adequate techniques for spending money, time and energy, recognizing the fact that human relations must be satisfying or our techniques cannot bring the results we hope for. We want work to be done with the competence of the professional, and in the spirit of the volunteer. We hope for teamwork - in the home - on the farm - in the office - in the factory. We need standards that will give us stability, yet allow for flexibility and for meeting the needs of the times.

"We realize the need for activity - for drive - for forging ahead. But this must not be made an excuse for tension. Serenity must be our keyword! Our job remains, or it has been - question - find problems - try to solve them. Test the answers. Chart as you go.

"We are human beings! Let us be worthy ones!"

Mrs. Julia Judson, who is both a professional home economist and a physical therapist now engaged as the Coordinator of a pioneer Disabled Homemakers Research Project, spoke from her four years of experience in helping disabled homemakers in the Department of Physical Medicine and Rehabilitation, New York University--Bellevue Medical Center. She said, "The Bellevue program has a three-fold purpose: to give patient training, train other workers in the field, and carry on a research program. The research was originally designed to gather information on (1) the specific problems of homemakers handicapped by various types of illness or accident; (2) techniques that could be used to overcome the problems; and (3) special devices and equipment needed by each patient.

"The results of this study indicated that the problems of handicapped homemakers are similar to those faced by all homemakers: the interrelation of the individuals in the family and the use of the human and financial

resources for the fulfillment of a desirable family life. The differences appear in the physical facilities which the handicapped homemaker should use in order to accomplish her job with the least physical effort and the greatest satisfaction. The methods of motion and time study and the application of the principles of work simplification have been the most direct way of evaluating and dealing with the problems presented by the individual homemakers." Mrs. Judson used slides and films to show how individual training is given and some of the practical results. She gave emphasis to the fact that inexpensive improvements and a large measure of ingenuity and common sense can reap large rewards in independence for the handicapped homemaker.

Mrs. Marjorie Lord, Home Demonstration Agent, Middlesex County, Connecticut, said, "In introducing work simplification techniques to homemakers, I find that women generally are not particularly analytical, nor mathematically inclined and that studies of time and energy saving have, of themselves, no particular appeal to homemakers. It is only when ideas are presented in such a way that women readily recognize their relationship to their personal welfare or to the welfare of their families that they are willing to take the trouble to analyze and improve their everyday habits of work."

Dr. John C. Allen, Physiatriest, Hartford Hospital and Dean, School of Physical Therapy, and consultant for the Workshop said in his welcoming speech: "The role of wife and mother as the keynote of family life is well recognized. It is also fairly obvious that when some condition arises which limits the homemaker's ability to function in her usual capacity, marked adjustments must be made which have far-reaching social, psychological and economic effects.

"The techniques of motion and time study and the principles of work simplification have proven to be effective devices for systematically studying and improving housekeeping methods. We are still in the pioneer stage in applying this scientific approach to the problems of the physically handicapped. We need the courageous cooperation of the patient along with the combined efforts of the medical personnel, engineers, home economists, architects and manufacturers in order to make it possible for the physically handicapped to approach normal living."

Miss Mary Rokahr, Assistant to the Chief, Division of Home Economics Programs, U. S. Department of Agriculture, Washington, D. C., said, "In presenting work simplification to homemakers, Extension Service staffs use many different methods. The talk or lecture if used in connection with illustrations, brings good results. The Staff of the Ohio State University have used successfully a lecture based on 'A Formula For Getting Things Done'. It uses three factors, mind, body and tools. For example, if a poor tool has to be used the body may have to work harder. A lot of good thinking may replace body effort or a better tool may be found. In the case of a disabled person, mind and tools must make up for physical handicaps if the patient is to have the satisfactions of being adequate in her job as a homemaker.

"Home Economics Extension teaching is now increasingly based on research. An example of such research being used in the Extension Program was a study by a graduate student at Kansas State Agricultural College on a better method of sorting soiled clothing. It was found that in a study of rural homemakers that 3/4 of them used the floor to sort clothes and were bending low over the task for 88% of the sorting period. Raising the height of the sorting area corrected the postural practices making it possible for the homemaker to spend most of the sorting time in an erect posture.

"The 'result demonstration', another method used by Extension workers, was illustrated by a series of slides from the University of Massachusetts that showed the before and after storage arrangements in a kitchen. This improved kitchen, at a cost of about \$10.00, demonstrated motion and time economy principles and became a center of instruction for the community."

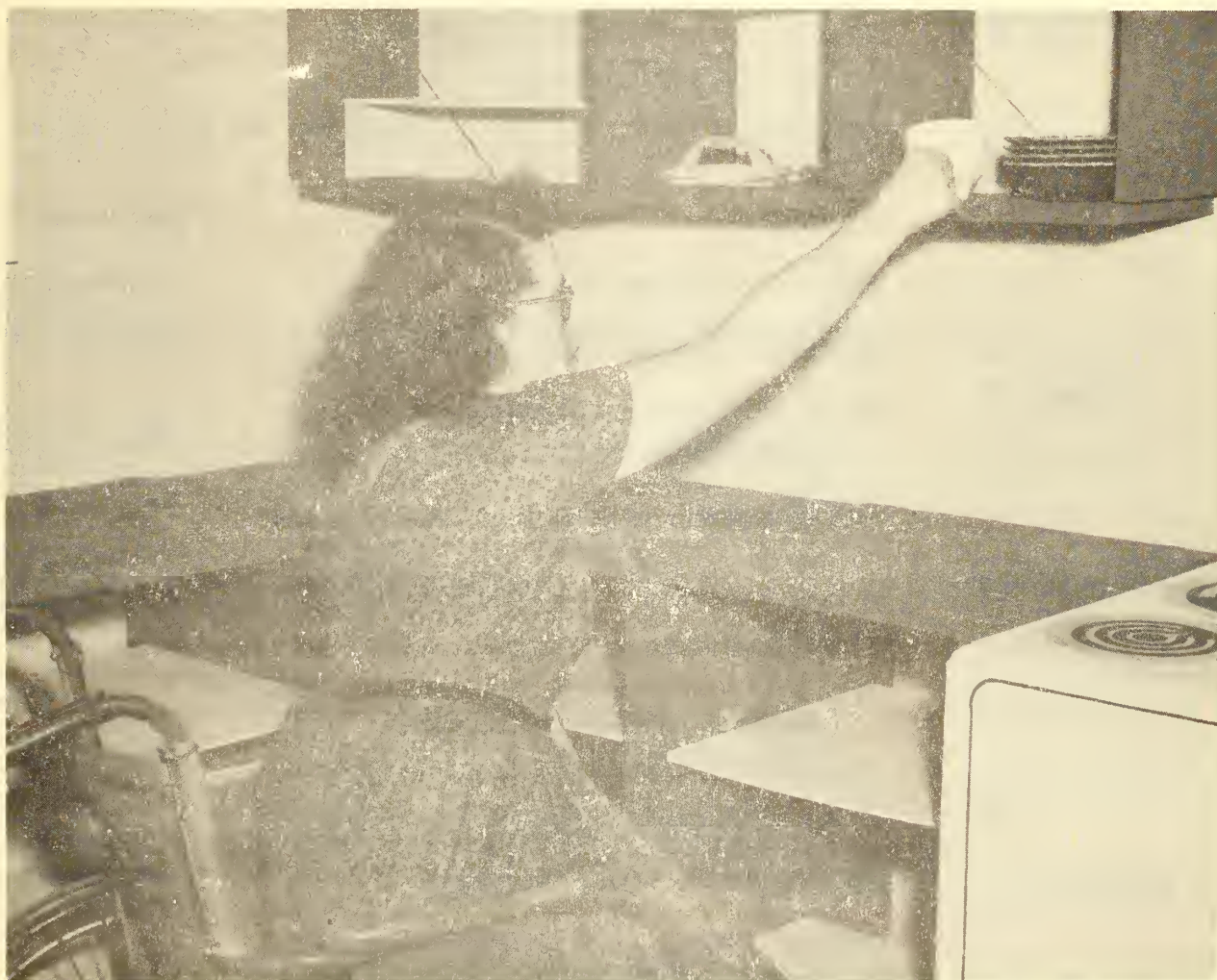
In discussing imperatives in kitchen planning, Miss Jane Callaghan, Kitchen Planning Consultant, said: "The needs of the family are a basic consideration to kitchen planning. The person or persons who will work in the kitchen, and the relative importance and frequency of jobs to be done there are of major importance. A kitchen should be made to measure for the homemaker who will work in it. Things should be stored within easy reach, work surfaces at a comfortable height, and places provided to work comfortably both while seated and while standing." An adjustable table and chair operated on swivels from old fashioned piano stools were used to demonstrate how to determine and measure correct working heights.

Miss Betty Jane Johnston, Assistant Professor in Home Management, School of Home Economics, University of Connecticut spoke in favor of labor saving equipment. She said: "Equipment represents a money solution to the problem of saving time and energy. In view of economic limitations to the amount of equipment families can buy, the need for choice-making becomes evident. Equipment can be evaluated according to ease of operation, ease of transport, ease of assembly, and ease of cleaning and storage. The location of controls and openings, and the way the door swings on automatic equipment will determine how useful the appliance can be to homemakers with various types of physical disability. Designs of tools and equipment are often ahead of house-keeping habits, and new equipment may require new motions and work methods if it is to be truly labor saving."

In summing up his reactions to the Workshop, Mr. Harold E. Smalley, Supervisor of the Motion and Time Study Laboratory of the University, said: "The marriage of home economics and industrial engineering holds much promise for the benefit of homemakers in general, and physically handicapped homemakers in particular. It is fortunate that attempts to improve home jobs to assist the physically handicapped usually result in improvements which are good for the physically able as well. This Workshop provided an opportunity for professional, private and public agency representatives to acquaint

themselves with motion and time study principles, and to discuss appropriate applications in the home for the benefit of the handicapped. Probably the most important objectives were the development of a questioning attitude based upon objective non-biased analyses and the establishment of a receptive atmosphere for the creation of motion-mindedness and work simplification consciousness on the part of the participant.

"The interests and enthusiasm which may have been generated in this Workshop might well be lost if the all-important follow-through is not carried out. It is imperative that the work which has begun be carried forward and implemented by research, application of principles, refresher courses, and additional workshops. Only through continuing efforts can industrial engineering be fully effective in assisting the physically handicapped."



The adjustable-portable kitchen was used to demonstrate good and poor arrangements for storage, working surfaces and equipment.

A P P E N D I X

AGENDA OF WORKSHOP PROGRAM

SUNDAY, JUNE 14

4:30-5:15 P.M. REGISTRATION (Continuing Education Center, Hall Dormitory)

6:45 P.M. Coffee

7:00 P.M.	Tour of Motion and Time Study Laboratory	Mr. Emerzian
		Mr. Parrish
		Mr. Smalley

7:15 P.M. Evening Program (Room 28, School of
Business Administration) Chairman, Mr. Brown

Greetings Dean May and Dean Ackerman

Purpose of Conference and Introduction of Staff	Mr. Brown
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Plans for Daytime Programs Mr. Smalley

Plans for Special Programs Miss Callaghan

Film: "Physically Handicapped Women
Keeping House" Miss Norcross

Keynote Talk Dr. Allen

MONDAY, JUNE 1,

8:30 A.M. Assembly

8:45 A.M. Philosophy of Methods Improvement, Types of
Studies, Classes of Change,
Possibility Guide Mr. Smalley

Film: "Classes of Change in the Home"

10:30 A.M. Principles of Motion Economy Mr. Emerzian

Films: "Principles of Motion Economy
in the Home"
"Jobs for Application of Motion
Economy (Home Economics)"

1:15 P.M. Process Charts, Flow Diagrams, and
 Product Analysis Mr. Smalley

Film: "Product Analysis in the Home"

MONDAY, JUNE 15 (Cont.)

3:00 P.M.	Applications Laboratory	Miss Callaghan
	Job Descriptions for Product Analysis	Miss Johnston
6:45 P.M.	Coffee - South Lounge - Wood Hall	
7:00 P.M.	Evening Session	Chairman, Mrs. Ruth Clark
	Demonstration	Mr. Brown
	"Heart of the Home" program as conducted in Middlesex County	Mrs. Lord
	Significant experiments in Work Simplifi- cation (Sponsored by Home Economics Extension Service in several States)	Miss Rokahr

TUESDAY, JUNE 16

8:30 A.M.	Assembly	
8:45 A.M.	Product Analysis Chart and Flow Diagram Laboratory	Mr. Emerzian Mr. Smalley
10:30 A.M.	Man Analysis Lecture and Laboratory	Mr. Emerzian
	Film: "Home Jobs for Man Analysis"	
1:15 P.M.	Operation Analysis	Mr. Smalley
	Film: "Home Jobs for Operation Analysis"	
3:00 P.M.	Applications Laboratory	Miss Callaghan
	Job Descriptions for Operation Analysis	Miss Johnston
6:45 P.M.	Coffee - South Lounge - Wood Hall	
7:00 P.M.	Evening Session	Chairman, Dean Widmer
	Correct Posture for Household Tasks Mr. James M. Bauer, Instructor, School of Physical Therapy	
	Photography, J. A. Manter Directed by Miss Bogert and Miss Tappan	

TUESDAY, JUNE 16 (Cont.)

Discussion and demonstration of sources
of material for leaders (Phamphlets,
books, slides, motion pictures)

Miss Callaghan

WEDNESDAY, JUNE 17

8:30 A.M. Assembly

8:45 A.M. Operation Analysis Laboratory

Mr. Smalley

Films: "Motion Economy Applied in the
Kitchen"
"Operations for Operation
Analysis (Home Economics)"

Mr. Emerzian

10:30 A.M. Multi-activity Analysis

Mr. Emerzian

Film: "Home Jobs for Multi-Activity
Analysis"

1:15 P.M. Multi-Activity Analysis Laboratory

Mr. Emerzian
Mr. Smalley

3:00 P.M. Applications Laboratory

Miss Callaghan

Film: "Cooking - Planning"

Examples of Multi-Activity Jobs and a
Discussion of Time Budgets

Miss Johnston

4:30 P.M. Assemble for trip to New London for dinner
and evening session

The Workshop group will join with repre-
sentatives of The June Conference of
The Service Bureau for Women's
Organizations Sponsored by The
Beatrice Fox Auerbach Foundation
Miss Florence Harrison, Director

6:00 P.M. Dinner - Jane Addams Hall, Connecticut
College for Women

7:00 P.M. Evening Program

Chairman, Miss Harrison

Panel Discussion - (Arranged by Miss
Norcross)

Questions for Discussion:

1. How can we better utilize men and women with various types of disability, for volunteer community work?
2. In what ways can voluntary agencies be helpful in programs involving the physically handicapped?

Address: "Utilizing Human Resources"
Dr. Lillian Gilbreth, Consulting Engineer

THURSDAY, JUNE 18

8:30 A.M.	Assembly	
8:45 A.M.	Micromotion and Memomotion Study	Mr. Smalley
	Films: "Meet the Therbligs" "Film for Film Analysis (Home Economics)"	
10:30 A.M.	Section A: Micromotion Film Analysis Laboratory	Mr. Emerzian
	Films: "Home Jobs for Film Analysis" "Transferring Eggs (For Film Analysis)"	
	Section B: Memomotion Film Analysis Laboratory	Mr. Smalley
	Film: "A Study of Kitchen Work"	
1:15 P.M.	Section A: Memomotion Film Analysis Laboratory	Mr. Smalley
	Film: "A Study of Kitchen Work"	
	Section B: Micromotion Film Analysis Laboratory	Mr. Emerzian
	Film: "Home Jobs for Film Analysis" "Transferring Eggs (For Film Analysis)"	
3:00 P.M.	Demonstration of the Mock-up Kitchen	Miss Callaghan Miss Johnston
5:00 P.M.	Picnic	

THURSDAY, JUNE 18 (Cont.)

7:30 P.M.	Evening Program	Chairman, Miss Norcross
	Film: "The Original Films of Frank B. Gilbreth"	

Friday, June 19

8:30 A.M.	Assembly	
8:45 A.M.	Film Analysis and Memomotion Charts Laboratory	Mr. Emerzian Mr. Smalley
10:30 A.M.	Home Layout	Miss Callaghan
	Film: "The Circular Workplace"	
1:15 P.M.	Home Layout Laboratory	Miss Johnston Mr. Emerzian
2:45 P.M.	Tea - Home Economics Reception Room Honoring Dr. Lillian Gilbreth	
3:00 P.M.	Session for Workshop Participants and Visitors Home Economics Equip- ment Laboratory, Room 1	Chairman, Miss Johnston
	Demonstration: Adjustment of Kitchen equipment to suit the particular needs of homemakers with various types of disabilities	Miss Callaghan Mrs. Judson
	Participants in the demonstration have been selected by	Miss Norcross
	"Mock-up" Kitchen was designed by Miss Callaghan and Mr. Brown. It is the property of the Connecticut Heart Association	
6:45 P.M.	Coffee - Home Economics Reception Room	
7:00 P.M.	Evening Program - Home Economics 103	Chairman, Mr. Chester
	Illustrated Lecture: "The Bellevue Disabled Homemakers Research Project"	Mrs. Judson

SATURDAY, JUNE 20

8:30 A.M.	Assembly	
8:45 A.M.	Labor Saving Devices	Miss Johnston
	Film: "Handles"	
10:30 A.M.	Summary and Review	Miss Johnston Miss Callaghan Mr. Emerzian Mr. Smalley
12:15 P.M.	Closing Luncheon - Whitney Hall, North Room	
	Toastmaster	Dean May
	Awarding of Certificates	Dr. Allen
	Address: "Looking Into The Future"	Dr. Gilbreth



The use of models of kitchen equipment in teaching work simplification is demonstrated by Mrs. Marjorie S. Lord, Connecticut Home Demonstration Agent to Mrs. Lewis A. DeBlois, National Program Director, Girl Scouts of the U.S.A., and Mrs. Hannah Pretzer, Department of Home Economics, Wayne, University.

DIRECTORY OF PARTICIPANTS

CONNECTICUT PARTICIPANTS

1. Connecticut Society for Crippled Children and Adults

Miss Gertrude Norcross, Executive Secretary
The Connecticut Society for Crippled Children and Adults
940 Asylum Street, Hartford, Connecticut

Miss Ruth M. Dalton - Occupational Therapist
The Connecticut Society for Crippled Children and Adults
740 Asylum Avenue, Hartford, Connecticut

Miss Mildred Sleeper - Occupational Therapist
Rehabilitation Center
The Connecticut Society for Crippled Children and Adults
Stamford, Connecticut

2. Connecticut Heart Association

Mrs. Elizabeth G. Speare
40 Chamberlin Road
Wethersfield, Connecticut

Miss Bessie Hatch, R. N.
Bridgeport Hospital
Bridgeport, Connecticut

3. State Department of Education - Bureau of Vocational Rehabilitation

Dr. Frederick W. Novis, Chief Consultant
Guidance Training and Placement
State Office Building, Hartford, Connecticut

4. State Tuberculosis Commission

Mrs. Louise L. Cady - Nursing Education Coordinator
State Tuberculosis Commission
119 Ann Street, Hartford, Connecticut

5. Office of Commissioner of Public Welfare

Miss Lorraine Loiacona - Medical Social Work Consultant
Department of Public Welfare
State Office Building, Hartford, Connecticut

6. Rocky Hill Hospital for Chronically Ill

Dr. Samuel A. Schuyler - Assistant Chief, Physical Medicine
and Rehabilitation
Rocky Hill Hospital for Chronically Ill
Rocky Hill, Connecticut

7. State Department of Health

Miss Sylvia Andronick - Public Health Nursing Consultant
State Department of Health
State Office Building, Hartford, Connecticut

8. Connecticut Physical Therapy Association also
National Multiple Sclerosis Society

Miss Edith L. Nyman, Chief Physical Therapist
New Haven Hospital
780 Howard Street, New Haven 11, Connecticut

9. Connecticut Occupational Therapy Association

Miss Suzanne Griselle - Occupational Therapist
Hartford County Rehabilitation Workshop of
The Connecticut Society for Crippled Children and Adults
30 Townley Street, Hartford, Connecticut

10. University of Connecticut, Storrs, Connecticut

A. School of Home Economics

Dr. Mary L. Greenwood, Associate Professor, Foods & Nutrition

Miss Elizabeth Rogge, Assistant Professor, Foods & Nutrition

Mrs. Vera B. Forsyth, Instructor in Home Economics

Mrs. Hester Nielson, Instructor in Home Economics

B. County Home Demonstration Agents

Mrs. Marjorie S. Lord, Middlesex County Home Demonstration Agent
Main Street, Portland, Connecticut

Mrs. Maria S. Preston, New Haven County Home Demonstration Agent
335 Prospect Street, New Haven, Connecticut

Miss Cora H. Webb, Tolland County Home Demonstration Agent
Prescott Block, Rockville, Connecticut

C. School of Nursing

Miss Elaine C. Raymond, Instructor, School of Nursing
13 DuBois Street, Stamford, Connecticut

11. Volunteers

- | | |
|--|---|
| A. Mrs. J. Garland Waggoner
2 Willowbrook Road
Storrs, Connecticut | B. Miss Georgianna Hoffman
Connecticut Institute of the
Blind
West Hartford, Connecticut |
| C. Miss Marilyn A. Young
Storrs, Connecticut | |

OUT-OF-STATE PARTICIPANTS

1. National Society for Crippled Children and Adults

Mrs. Elizabeth M. Wagner, Occupational Therapy Consultant
13 East Ninth Street, New York 3, New York

2. National Foundation for Infantile Paralysis

Miss Ethel M. Spears, Associate Director of Professional Education
120 Broadway, New York, New York

3. National Tuberculosis Association

Mrs. Phoebe Harrison Goff, Associate
Rehabilitation Division, 1790 Broadway, New York, New York

4. Girl Scouts of America

Mrs. Lewis A. DeBlois, Director
Program Department, 155 East 44th Street, New York, New York

5. Colleges and Universities

- A. Miss Hannah Pretzer, Department of Home Economics
Wayne University, Detroit 1, Michigan
- B. Miss Helen Chambers, Associate Professor of Clothing
Hood College, Frederick, Maryland
- C. Miss Anna L. Wood, Assistant Professor, Home Planning,
Housing Research, State College of Washington, Pullman, Washington
- D. Mr. H. Dale Freidman, Assistant Chief
Department of Physical Medicine and Rehabilitation
School of Medicine
University of Buffalo Chronic Disease Research Institute
452 Ellicott Square, Buffalo, New York

6. Press

Mrs. Eva B. Hansl, Journalist
240 East 23rd Street, New York 10, New York

AGENDA OF WORKSHOP PROGRAM OPEN TO VISITORS

FRIDAY, JUNE 19

- 11:30 A.M. Registration (no fee) School of Home Economics
- 12:15 P.M. Luncheon: Whitney Cafeteria
- 1:00 P.M. Campus Tour
- 1:30 P.M. Discussion of the Workshop Objectives. Room 103,
Home Economics
Chairman - Mrs. Elizabeth Eckhardt May
Dean, School of Home Economics
- Motion Pictures on Motion and Time Study
(Prepared especially for the Workshop)
- Address: Dr. Lillian Gilbreth, Consulting Engineer
"The Significance of Applying the Principles of Motion
and Time Study to the Problems of Home Management"
- 2:45 P.M. Tea honoring Dr. Lillian Gilbreth
Home Economics Reception Room
- 3:00 P.M. Session for Workshop Participants and Visitors
Home Economics Equipment Laboratory, Room 1
- Chairman: Miss Betty Jane Johnston, Home Management
Department School of Home Economics, University
of Connecticut
- Demonstration: Adjustment of kitchen equipment to suit
the particular needs of homemakers with various types
of disability
- Miss Jane Callaghan, Consultant on Kitchen Planning,
New York City
- Mrs. Julia Judson, Coordinator, Disabled Homemakers
Research Project, New York University, Bellevue
Medical Center
- Participants in the demonstration have been selected by:
Miss Gertrude Norcross, Executive Secretary
Connecticut Society for Crippled Children and Adults

FRIDAY, JUNE 19

The "mock-up" kitchen was designed by Miss Callaghan and Mr. Horace A. Brown, Executive Secretary, Connecticut Heart Association. It is the Property of the Connecticut Heart Association.

5:30 P.M. Dinner - Whitney Cafeteria
6:45 P.M. Coffee - Home Economics Reception Room
7:15 P.M. Evening Program - Home Economics, Room 103

Chairman, Mr. Edward Chester, Bureau Chief, Bureau of Rehabilitation, State Department of Education

Illustrated Lecture: "The Bellevue Research Project"
Mrs. Julia Judson, Coordinator,
Disabled Homemakers Research Project
New York University-Bellevue
Medical Center

SATURDAY, JUNE 20

7:30 A.M. Breakfast - Whitney Cafeteria
8:15 A.M. Inspection of Exhibits - Room F, Continuation Study Center
8:45 A.M. Inspection of Motion and Time Study Laboratory
 School of Business Administration
9:00 A.M. Review of films made especially for the workshop
 (continued) Room 2, School of Business Administration

Chairman: Mr. Harold E. Smalley
 Supervisor, Motion and Time Study Laboratory,
 School of Business Administration
 University of Connecticut

10:30 A.M. Coffee, Room 2, School of Business Administration
10:45 A.M. Summary of Workshop Activities
 Room 28, School of Business Administration

Miss Johnston, Miss Callaghan, Mr. Emerzian, Mr. Smalley

SATURDAY, JUNE 20 (Cont.)

12:15 P.M.

Closing Luncheon - North Room, Whitney Hall

Chairman: Mrs. Elizabeth Eckhardt May
Dean, School of Home Economics
University of Connecticut

Awarding of Certificates Dr. John C. Allen
Chief of Physical Medicine and Rehabilitation,
Hartford Hospital and Dean of School of
Physical Therapy, University of Connecticut

Address: "Looking Into the Future" Dr. Lillian Gilbreth
Consulting Engineer



Mrs. Julia Judson demonstrates how a wheelchair patient can manage the family laundry. The combination washer-dryer makes it unnecessary to lift wet clothes.

DIRECTORY OF VISITORS

Magazine Editors

Miss Charlotte Adams
Charm Magazine
575 Madison Avenue
New York 22, New York

Miss Margaret Huck
Woman's Home Companion
645 Fifth Avenue
New York 19, New York

Miss Polly Weaver
Mademoiselle
575 Madison Avenue
New York 22, New York

Out-of-State

Miss Marion V. Fegley
Consultant, Community Health
Education
Nassau County TB & Public
Health Association
Roslyn, New York

Dr. Helen S. Mitchell
Dean of Home Economics
University of Massachusetts
Amherst, Massachusetts

Mr. Vlad F. Ratay
Regional Representative
U. S. Department of Health,
Education and Welfare
Office of Vocational
Rehabilitation
Boston, Massachusetts

Mrs. George J. Dobranske
Director of Curriculum
Boston School of Occupational Therapy
7 Harcourt Street
Boston, Massachusetts

Miss Helen E. Armstrong
Home Economics Advisor
Public Service Electric & Gas Co.
Morristown, New Jersey

Mrs. Karin Roon, Author
New York, New York

Miss Eloise Davison
Home Economics Consultant
Hill & Knowlton, Inc.
New York, New York

Miss Verda Dale
Extension Service, Housing
Specialist
University of Massachusetts
Amherst, Massachusetts

Miss Gladys M. Hunt, R.N.
Design Consultant
Disabled Homemakers Research
Project
N.Y. Univ.-Bellevue Medical
Center
400 East 34th Street
New York 16, New York

Mrs. Philippa E. Grover, OTR
Staff Therapist
Bay State Clinic
Boston, Massachusetts

Miss Ethyl R. Grady
Assistant Research
Professor
University of Rhode Island
Kingston, Rhode Island

State and Local

Miss Florence H. Hickok
Educational Director
Undercliff State TB Sanitorium
Meriden, Connecticut

Miss Ruth Cowles
Consultant, Home Economics Education
State Department of Education
Hartford, Connecticut

Mrs. Frank Munson
Laurel Grove Road
Middletown, Connecticut

Miss Erna Fisher
Home Service Division
Hartford Electric Co.
266 Pearl Street
Hartford 15, Connecticut

Mr. Anthony Giorgia
State Department of Health
Hartford, Connecticut

Mrs. Ellen Teller
County Home Demonstration Agent
95 Washington Street
Hartford, Connecticut

Mrs. Margaret K. Jones
Conn. State Department of Health
Hartford, Connecticut

Mr. George E. Barker
Pre-Eastern Windham County Heart Assoc.
R.F.D. #3, Putnam, Connecticut

Mrs. Carolyn Widmer
Dean, School of Nursing
University of Connecticut
Storrs, Connecticut

Miss Lucy De Angelo
Public Health Nurse
Consultation Clinic
New Haven, Connecticut

Mrs. Grace F. Harrison
Assistant Consultant, Home
Economics Education
State Department of Education
Hartford, Connecticut

Miss Eloise Keckefelt
State Department of Health
Hartford, Connecticut

Mr. Luscomb
Hartford Electric Light Co.
266 Pearl Street
Hartford 15, Connecticut

Mrs. Gertrude Crosthwait
Home Service Director
Connecticut Light & Power Co.
P. O. Box 2010
Hartford, Connecticut

Miss Mary E. Watson,
Nutritionist
Conn. Dairy & Food Council,
Inc.
108 Gillett Street
Hartford 5, Connecticut

Miss Florence Mendelsoln,
R.P.T.
Milford Public Schools
Milford, Connecticut

Mr. Wells Gunningham
Executive Secretary
New Britain Heart
Association
New Britain, Connecticut

Miss Ruth M. Olson, R.N.
Conn. State Dept. of Health
Bureau of Maternal & Child
Hygiene, 165 Capitol Ave.
Hartford, Connecticut

Miss Alice E. Verna
Bureau of Maternal & Child Hygiene
State Department of Health
Hartford, Connecticut

Miss Ida Raymond
Public Health Nursing
Consultant
State Department of Health
Division of Crippled
Children
436 Capitol Avenue
Hartford, Connecticut

Miss Mary Belanger, Physical
Therapist
State Department of Health
436 Capitol Avenue
Hartford, Connecticut

Miss Sara C. Johnson
Physical Therapy Supervisor
State Department of Health
436 Capitol Avenue
Hartford, Connecticut

Miss Ruth L. Work, OTR
State Veterans Home & Hospital
Rocky Hill, Connecticut

Miss Florence Williams,
Dietitian
Mansfield Training School
& Hospital
Mansfield Depot, Connecticut

Miss Shirley E. Read
Association Home Demonstration
Agent
Middlesex County
Portland, Connecticut

Mrs. Sylvia H. Lyman
Homemaking Teacher
Windham Regional School
Willimantic, Connecticut

Miss Constance L. Dimock
Homemaking Teacher
Windham High School
Willimantic, Connecticut

Mrs. Marie G. Helmboldt
Homemaking Teacher
Windham High School
Willimantic, Connecticut

Mrs. Ruth Russell Clark
State Home Demonstration Leader
Agriculture Extension Service
University of Connecticut
Storrs, Connecticut

Miss Lisbeth Macdonald
Retired, Ext. Specialist,
Rural Health
University of Connecticut
Storrs, Connecticut

Mrs. Allen E. Eldridge
Homemaker
Box 423, Storrs, Connecticut

Mrs. G. S. Torrey
Homemaker
Storrs, Connecticut

Mrs. Janice W. Smith, Instructor
Child Development & Family Relations
University of Connecticut
Storrs, Connecticut

Mrs. M. R. Work
Homemaker
Storrs, Connecticut

Mrs. Rufus Munsell
Homemaker
Storrs, Connecticut

Mrs. A. L. Knoblauch
Homemaker
Storrs, Connecticut

A PARTIAL LIST OF AGENCIES AND INSTITUTIONS
CONCERNED WITH WORK SIMPLIFICATION PROBLEMS OF
PHYSICALLY HANDICAPPED HOMEMAKERS*

American Heart Association
1775 Broadway
New York, New York

University of Buffalo
Dept. of Physical Medicine & Rehabilitation
Buffalo Research Center, American Heart
Association
452 Ellicott Square
Buffalo, New York

Cornell University
College of Home Economics
Ithaca, New York

Florida State University
College of Home Economics
Tallahassee, Florida

Girl Scouts of America
155 East 44th Street
New York, New York

University of Illinois
Small Homes Council
Urbana, Illinois

Kansas State Agriculture College
School of Home Economics
Manhattan, Kansas

Michigan State University
School of Home Economics
East Lansing, Michigan

National Foundation for Infantile
Paralysis
120 Broadway
New York 5, New York

National Multiple Sclerosis Society
270 Park Avenue
New York, New York

National Safety Council
20 North Wacker Drive
Chicago 6, Illinois

National Society for Crippled
Children and Adults
13 East Ninth Street
New York 3, New York

National Society for the Prevention
of Blindness
1790 Broadway
New York 19, New York

National Tuberculosis Association
Rehabilitation Division
1790 Broadway
New York, New York

New York University-Bellevue
Medical Center Dept. of Physical
Medicine and Rehabilitation
New York, New York

Purdue University
School of Home Economics
Lafayette, Indiana

U. S. Department of Agriculture
Extension Service
Washington 25, D. C.

U. S. Department of Health,
Education and Welfare
Office of Vocational Rehabilitation
Washington 25, D. C.

*This list is limited to agencies and institutions that furnished publications for the workshop and with whom University of Connecticut Workshop staff had first hand contact in connection with the Workshop.

University of Vermont
Experiment Station
Burlington, Vermont

Washington State College
School of Home Economics
Pullman, Washington

Wayne University
Department of Home Economics
Detroit 1, Michigan



Homemaker on crutches demonstrates the advantages of a high oven.

FILM STRIPS ON MOTION AND TIME STUDY APPLIED TO HOME MAKING

Produced or Presented by School of
Home Economics and Motion and Time
Study Laboratory, University of
Connecticut (For Inquiries on
Subject Matter)

Distributed by
Audio-Visual Aids Center
University of Connecticut
(For Inquiries on Booking)

CONDITIONS GOVERNING FILM RENTAL SERVICE

1. Films listed are available as a service of the University to the people of the State of Connecticut. Understandably, therefore, their needs have priority over out-of-State requests.
2. The service or rental charge is listed with each film and is based on the cost of the film to the University.
3. The borrower pays transportation costs both ways. Films are sent pre-paid, postage being included in the service charge.
4. The borrower may schedule films up to three days at the base rate listed with the title if this wish is indicated at the time of the order. Otherwise, they are scheduled for one day use. One-half of the base rate is charged for each subsequent day's use of a motion picture.
5. Films will be sent parcel post insured unless the borrower specifies otherwise.
6. The user is responsible for damage or loss of film while it is in his possession. All films are carefully measured, rewound, and otherwise inspected after each booking.
7. Rental or service charges will be billed to all users by the business office of the University. Payment should be made to that agency upon receipt of the invoice.

HOW TO ORDER

For maximum service, it is suggested that films be ordered well in advance of the day of use. Two weeks is a desirable minimum, however, we will do all we can to cooperate if last minute calls are made. Films may be ordered by telephone as it is possible to state their availability in a few minutes. When ordering give the TITLE and the date or dates when films are to be used.

INFORMATION

For inquiries concerning subject matter, consult Mary Rokahr, School of Home Economics, or Harold E. Smalley, Supervisor of the Motion and Time Study Laboratory and for inquiries concerning rental charges and booking dates, contact Carlton W. H. Erickson, Director of the Audio-Visual Aids Center.

MOTION STUDY FILMS APPLIED TO HOMEMAKING PRODUCED AT THE UNIVERSITY OF CONNECTICUT

These films were produced by the Motion and Time Study Laboratory of the School of Business Administration in cooperation with the School of Home Economics. They represent a pioneer attempt to apply the principles of work simplification as used in industry to the home, and are not a professionally finished product.

CIRCULAR WORKPLACE, THE - 12 min - 16 si - \$1.50 - 1953. Grouping tools and equipment within the circle of normal and maximum working areas and measurements in the horizontal and vertical planes. Semi-circular set-up of baking center, cupboard storage and hanging clothes on line show frequently used things within easy reach and seldom used articles outside normal area. (c-a)

CLASSES OF CHANGE IN THE HOME - 18 min - 16si - \$1.50 - 1953. Mundel's five classes of change are illustrated by making changes in a mixing job. The possibility guide is used to record changes in hand and body motions, tools, workplace and equipment, process, product, and raw material. (c-a)

HOUSEHOLD BODY MECHANICS - 14 min - (details regarding whether sound or silent, loan charge, etc. available later) - 1953. Demonstrates correct posture in a variety of household tasks. Body balance and correct alignment are demonstrated in activities involving walking, standing, pushing, pulling, and so on.

MEET THE THERBLIGS - 18 min - 16si - \$1.50 - 1953. Illustrates the basic elements of motion common to all types of activity as discovered by Gilbreth. Examples from business, industry, agriculture, and nursing. Homemaking activities illustrate each of the 17 therbligs as defined by Mundel. (c-a)

PHYSICALLY HANDICAPPED WOMEN KEEPING HOUSE - 26 min - 16si (single perforated film) - \$2.00 - In cooperation with The Connecticut Society for Crippled Children and Adults - 1953. Pictures of women who carry on homemaking activities in spite of limitations resulting from polio, cerebral palsy and arthritis. Some are in wheelchairs, some have limited use of hands and arms. A blind woman does a skillful job of ironing. A number of self-help devices are used. (This film must not be used on a silent projector having more than one pull-down claw, or one set of sprocket teeth.) (c-a)

PRINCIPLES OF MOTION ECONOMY IN THE HOME - 35 min - 16si - \$2.50 - 1953. In this film the principles of motion economy have been applied to homemaking activities. Each of the 22 principles, as stated by Barnes, is illustrated, first by a situation which violates the principle, then by a contrasting activity in which the principle is followed.

PRODUCT ANALYSIS IN THE HOME - 16 min - 16si - \$1.50 - 1953. The operation analyzed is a method of handling laundry. Clean sheets are delivered by the laundryman and stored in the linen closet. Later they are distributed to the bedrooms, beds are stripped, and soiled sheets are sent to the laundry. A process chart is drawn, step by step, following the various scenes of the operation. This is followed by a sketch of the floor plan and flow diagram. (c-a)

TRANSFERRING EGGS (FOR FILM ANALYSIS) - 7 min (plus participation) 8 reels - 16si - \$1.00 - 1953. Four short cycles of each of the original and improved methods are provided on 8 small reels. This repetitive operation was photographed with a microchronometer in view. (c-a)

ADDITIONAL SOURCES FOR FILMS

ANALYTICAL MOTION STUDY - 41 min - 16si - \$2.50 - Motion and Time Study Laboratory University of Alabama - 1948. This instructional film gives an overall survey of motion study together with its functions and techniques. The analyses illustrated include product, man, operation, and multi-activity of the process chart type, and photograph and film analysis of the micromotion study types. (c-a)

COOKING: PLANNING - 11 min - 16sd - \$1.50 - Young America Films - 1949. Illustrates a well-ordered kitchen in which the housewife has organized the kitchen equipment and cooking utensils for greatest ease and efficiency in her work. Shows what can happen when the preparation of a meal is attempted without adequate planning, and how trouble can be prevented by planning and by the use of such devices as the Time-Chart. (sh-c)

DEFINITION OF THERBLIGS - 8 min - 16si - \$1.50 - Motion and Time Study Laboratory Purdue University - 1943. This film consists of twenty (20) numbered sequences illustrating each of the therbligs, and is designed to help the instructor define the beginning, content, and end point of each therblig. (c-a)

FILM FOR FILM ANALYSIS (Home Economics) - 3 min (plus participation - 16si - \$1.50 - Purdue University. Canning vegetables, original with microchronometer; peeling tomatoes, original with microchronometer. (c-a)

FILMS FOR FILM ANALYSIS AND SIMO CHARTING (DRAWER PULL ASSEMBLY) - 12 min (Plus participation) 16si - \$1.50 - Motion and Time Study Laboratory, Purdue University - 1943. To provide for practice in micromotion film analysis and graphical presentation, this series consists of seventeen (17)

short reels. The first reel shows photographs and drawings of the parts which go to make up the drawer pull assembly and then presents instructions as to how to read the microchronometer. The other sixteen (16) reels consist of the following methods of performing the assembly. Reel 1, Hand Assembly; Reel 2, Hand Assembly; Reel 3, Power Assembly; Reel 4, Power Assembly; Reel 5, Hand Assembly; Reel 6, Hand Assembly; Reel 7, Power Assembly; Reel 8, Power Assembly; Reel 9, Dual Hand Assembly; Reel 10, Dual Hand Assembly; Reel 11, Dual Hand Assembly; Reel 12, Dual Hand Assembly; Reel 13, Dual Power Assembly; Reel 14, Dual Power Assembly; Reel 15, Dual Power Assembly; Reel 16, Dual Power Assembly.

FLOW PROCESS CHART AND HOW TO USE IT - 15 min - 16sd - \$2.50 - color - (Library of Congress) UWF - 1948. How to prepare a flow process chart to study and apply work simplification; four keys to process charting; operation, transportation, storage, and inspection. (c-a)

IRONING CAN BE EASY - 16sd - color - The Proctor Electric Company, 480 Lexington Avenue, New York 17, New York. This film suggests ironing techniques that can be used for the family laundry.

JOBS FOR APPLICATION OF MOTION ECONOMY (Home Economics)-6 min - 16si - \$1.50 - Purdue University. Serving soup, original and improved methods; assembling fresh fruit salad, original and improved methods; setting up a menu board, original and improved methods. (c-a)

MOTION ECONOMY APPLIED IN THE KITCHEN - 8 min - 16si - \$1.50 - Purdue University. Measuring baking power, three different ways; measuring spices from different types of cans; selecting spices from shelf. (c-a)

OPERATIONS FOR OPERATION ANALYSIS (Home Economics)-4 min (plus participation) - 16si - \$1.50 - Purdue University. Serving carrots, original and improved method; serving coffee, original and improved method; sacking crackers, original and improved method; wrapping silver, original and improved methods. (c-a)

ORIGINAL FILMS OF FRANK GILBRETH, THE - 48 min - 3 reels - 16si - \$2.50 - Chicago Chapter, Society for Advancement of Management - 1944. Frank B. Gilbreth during his lifetime made over 250,000 feet of 35mm motion picture film of a wide variety of subjects. Out of his researches motion study was developed. James S. Perkins, after reviewing and indexing these original films, selected certain sequences to supply the historical background of motion study techniques.

PRINCIPLES OF MOTION ECONOMY - 45 min - 16si - \$2.50 - Department of Industrial Engineering, University of Alabama - 1947. Each of the 22 principles are stated and illustrated by showing jobs which violate principles and jobs which are performed in accordance with specific principles. Illustrations include jobs in the factory, home, school, office and sports. (c-a)

STEP-SAVING KITCHEN - 14 min - 16sd - \$1.00 - color - USDA - 1948. A colorful portrayal of how a modern kitchen saves time and energy - for anyone,

anywhere. The U-shaped kitchen demonstrated was designed by housing and equipment specialists. (jh-sh-c-a)

STUDY OF KITCHEN WORK, A: Breakfast Preparation - 6 min - 16 si - \$1.50 - Purdue University. Memomotion film for process chart analysis. Footage method, better method, better method and better arrangement. Taken at 1 frame per second. (c-a)

WAYS AND MEANS - si - Ingenuity Unlimited Studio, 233 East 54th Street, New York 22, New York. Shows one-hand Dvorak typewriter and two types of experimental crutches.

WITHIN YOUR REACH - 12 min - 16sd - \$1.50 - Cornell - 1947. This film shows how to simplify the kitchen storage of utensils and supplies, to eliminate needless lifting, reaching, stooping and walking. (sh-c-a)

SOUND SLIDE FILM

HEART OF THE HOME - order from American Heart Association, New York, New York. Weekly rental \$1.00. Purchase \$19.50. 35mm. color sound slide film, transcription 33 1/3 RPM. Running time 14 min. Based on original work simplification kitchen designed for cardiac housewives.

A SELECTED LIST OF CURRENT REFERENCES ON PRINCIPLES OF WORK SIMPLIFICATION APPLIED TO PROBLEMS OF PHYSICALLY ABLE AND DISABLED HOMEMAkers

Compiled by Betty Jane Johnston and Mary Rokahr,
School of Home Economics, University of Connecticut, Storrs, Connecticut

BOOKS

- | | |
|--|--|
| Barnes, Ralph M. - <u>Motion and Time Study</u> . New York; John Wiley and Sons, 1937-1940 1949. | Basic motion and time study. Emphasis on principles of motion economy, techniques of charting, time study and standards. Industrial examples. |
| Cushman, Ella M. - <u>Management in Homes</u> . New York; The Macmillan Company, 1945. | Descriptive college textbook of activities of college girls who studied and applied work simplification principles to homemaking using real life situations. |
| Fitzsimmons, Cleo - <u>The Management of Family Resources</u> . San Francisco; W.H. Freeman & Co., 1950. | College textbook includes chapter on time and motion study. |
| Gilbreth, Lillian M. - <u>The Homemaker and Her Job</u> . New York; D. Appleton-Century Company, 1927. | A pioneer book in applying to the home work simplification principles developed in industry. How, why, when, who, |

- where and what of homemaking.
- Gross, Irma H.; Crandall, Elizabeth W.-
Home Management in Theory and Practice.
New York; F. S. Crofts & Co., Inc., 1947.
- A college textbook. Defines work simplification, includes history of movement and application.
- Kosma, Andrew R. - The A.B.C.'s of Motion Economy. P. O. Box 116, Newark, N.J.; Institute of Motion Analysis and Human Relations, 1943.
- Elements of motion described and illustrated. Causes of fatigue and principles of human relationships. Humorous cartoon on work simplification in factory.
- Mundel, Marvin F. - Motion and Time Study, Principles and Practice.
New York; Prentice-Hall, Inc., 1950.
- Basic principles of motion and time study. Many illustrations, chiefly industrial.
- Nickell, Paulena and Dorsey, Jean Muir -
Management in Family Living. New York; John Wiley & Sons, 1942 & 1950.
- A college textbook. Part 2 covers time and energy management including up to date review of work simplification studies.
- Ramsey, Charles George and Sleeper, Harold Reeve - Architectural Graphic Standards. New York; John Wiley & Sons, 1951.
- Illustrative plans for architects, engineers, decorators, builders and draftsmen classified under topics such as storage, laundry, kitchens, furniture and space sizes for houses.
- Busk, Howard A. - Living with a Disability
Garden City, N.Y.; The Blakiston Co., Inc. 1953.
- The intention of the book "is to make available knowledge of existing inventions and discoveries which may help disabled persons find something from which they can derive greater independence, efficiency, happiness and comfort." Well illustrated.
- Smalley, H.E.-Motion and Time Study Laboratory Manual. Dubuque, Iowa; William C. Brown Company, 1948.
- For laboratory practice. Brief explanations of motion and time study techniques.
- Vaughan, Lawrence M. and Hardin, Lowell S. - Farm Work Simplification. New York; John Wiley & Sons, Inc.
- Examples on "how to do" apply equally well to homemaking. Suggestions for training programs, research and visual aids reference lists.
- Wright, Mary and Russell - Guide To Easier Living. New York; Simon and Schuster.
- Popular book giving ideas on how to choose and manage furniture and furnishings with an eye towards easier living. Illustrated.

Yost, Edna in collaboration with
Dr. Lillian M. Gilbreth - Normal
Lives for the Disabled. New York;
The Macmillan Company, 1945.

"Shows reader not only what can be
and should be done, but how and why."
Part 1 deals with "making up your
mind to work." Part 2, getting ready
for work. Part 3, on the job, and
Part 4, what about the future?
Written with "you" approach for
disabled.

BULLETINS, CIRCULARS AND POSTERS

American Gas Association
New York, New York

Heart Saver Kitchen - 2 page reprint,
Woman's Home Companion, October 1951,
by Bernice Shaw.

Colored pictures and description of
kitchen arrangement and storage ideas
adapted from plans of the American
Heart Association.

American Heart Association
1775 Broadway
New York 19, New York

Heart-of-the-Home - Picture Bulletin
28 pp. - 10¢ (Distributed free by many
State Heart Associations)

Simple floorplan, details, and photo-
graphs of the work simplification
kitchen designed for cardiac housewives.
A 10 page introduction outlines in
simple terms the principles of work
simplification and suggests how to
apply them.

Heart of the Home -

A 4 page leaflet to be handed out after
showing the sound film. Suggests ways
to simplify kitchen work without
investing in equipment or carpentry.

No. 1 Take It Easy!, Harriet U. Fish.

You can teach old dogs new tricks
IT'S UP TO YOU! Illustrates ironing,
dusting and bedmaking.

No. 2 Take It Easy!, Harriet U. Fish.

What to do? Is this YOUR back bent in
two? Working heights and five step
plan of work simplification.

No. 3 Take It Easy!, Harriet U. Fish.

Up-si-Daisy - Why, When, Who, Where
and How? Leaflet with illustrations.

American Medical Association
Chicago 10, Illinois

University of California
Publications Office
Room 22, Giannini Hall
Berkeley 4, California

Camp Fire Girls, Inc.
Program Department
16 East 48th Street
New York 17, New York

University of Illinois
Small Homes Council
Urbana, Illinois

A Kitchen for the "Take It Easy Cook,"
Anna May Wilson. Reprint, TODAY'S HEALTH
October 1952.
Story and pictures of a kitchen built by
Heart of Home Committee of Chicago Heart
Association. Article closes with list
of work simplification ideas that can be
used in any home.

Find the Easy and the Best Way for Any Job
You Do, Julia Pond, 1949, 4 pp. mimeo.
Applies eight work simplification princi-
ples to homemaking tasks.

Plan the Use of Your Time, Julia Pond,
1949, 4 pp. mimeo.
Why and how to plan; how to make a plan
work and blanks for listing "musts and
may do's". Popular circular.

Services With and For Handicapped Children
24 pp. 25¢ 1952.
A circular for leaders of Camp Fire Girls
on how to begin a project, suggested
activities, resources and training.

Cabinet Space for the Kitchen - No. 5.31,
Helen E. McCullough, 8 pp.
Lists of items usually stored together
with where and how to store. A review
of research studies. Requirements for
ample and minimum space and how to use
data.

Easier Washdays - No. 5.34
Nellie L. Perkins, 1944, 28 pp.
Ways to reduce fatigue through organi-
zation and eliminating of unnecessary
stooping, stretching, and lifting and
carrying loads.

Kitchen Planning Standards - No. 5.32,
Elizabeth M. Ranney, 1949. 8 pp.
Planning faults found in 103 kitchen
plans together with a three-step
method for determining space require-
ments and planning efficient operations.
A suggested scoring sheet.

Reducing Time and Motions in Dishwashing -
He507, Cleo Fitzsimmons, 11 pp. mimeo.

Suggested procedures outlined and information on selection and arrangement of equipment. Some dishwashing standards and methods of obtaining them.

Space Design for Household Storage - No.557
Helen E. McCullough, 1952, 74 pp.

Reports results of study on storage requirements of household articles and shows how storage units can be incorporated in existing houses and in plans for new homes. Complete information on sizes of equipment and materials to be stored. Well illustrated.

University of Connecticut
College of Agriculture
Mailing Room
Storrs, Connecticut

Housekeeping Short Cuts, Sidney Korando,
April 1950, Mimeo. 6pp.

Six rules for efficiency; check list on "How do you work?" how to cut down on "stoop-bend-stretch" and blanks for writing in reasons for time saving.

Iowa State College
Extension Service
Ames, Iowa

Let's Do Dishes -- No. HE17, Margaret
Kagarice, (Oct. 1950) 4 pp.

Popular circular with illustrations. Information on getting ready, doing, and cleaning up.

Make Your Kitchen Modern - No. P92,
Naomi Shank, Aug. 1948, 51 pp.

Compilation of pictures and ideas of ways Iowa families have modernized their kitchens. Principles of kitchen arrangement reviewed and illustrated.

Make Your Work Easier - FS 457 Revised
4 pp. Reprint from Nov. 1952 Iowa Farm
Science, Fannie Cannon and Naomi Shank.

Popular leaflet explains why homemakers become fatigued and what to do about it. Pictures illustrate six work simplification principles.

Kansas State College
School of Home Economics
Manhattan, Kansas

Arrangement for the Sorting Process of
Home Laundry as Affected by Economy of
Motion -- An unpublished Master's Thesis
by Ethel W. Self.

Economy of Time and Effort in the Hand
Ironing of Certain Flat Pieces - An
unpublished Master's Thesis by Ethel Cohen.

The Kitchen Reporter
Kelvinator Kitchen
Detroit, Michigan

- Jan. 1950 - The Homemaker's Business
Center in the Kitchen
Muriel L. Smith.
- Jan. 1950 - The Physically Handicapped
and Kitchen Operation
Julia S. Judson.
- April 1951 - Choicemaking and the House
Maude Wilson.
- April 1951 - Time Management in the Kitchen
Jean Muir Dorsey.
- May 1951 - Let Your Body Work for You
Dr. Esther Crew Bratton.
- June 1951 - Time Management in Grocery
Storage
Dr. Charlotte Biester.
- June 1951 - Your Kitchen Arrangements Can
Work for You!
Mary Koll Heiner and Rose E.
Steidl.
- Sept. 1952 - Giving the Body a Break in
the Kitchen
John G. Pielawski, M.D.
- Sept. 1952 - Michigan Cardiac Homemakers
Learn How to Save Energy
John G. Pielawski, M.D.
- Jan. 1953 - How a Handicapped Homemaker
Has Revised Her Work Habits
Myrtle Campbell Albertson.
- May 1953 - A Sewing Center in the Kitchen
Margaret Slaughter.
- June 1953 - Psychological Aspects of
Kitchen Fatigue
Franklin G. Ebaugh, M.D.

Look Magazine
Dept. T
511 Fifth Avenue
New York 17, New York

University of Massachusetts
School of Home Economics
Amherst, Massachusetts

Time and Motion Study of Getting Breakfast-
Furdue University, November 9, 1958.

6 - 8x10 "Energy Used on Reaching" Charts
based on research study by Esther C.
Bratton, Cornell University, Ithaca, N.Y.

1 - 8x10 Chart showing poor and good dish
storage shelf arrangement.

Memorial Center
44 East 68th Street
New York 21, New York

National Electric Products Corp.
Pittsburgh, Pennsylvania

The National Society for Crippled
Children and Adults, Inc.
11 South LaSalle Street
Chicago 3, Illinois

National Tuberculosis Assoc.
1790 Broadway
New York 19, New York

University of Nebraska
Extension Service
Lincoln, Nebraska

Who's Handicapped? - Bradley E. Coley, M.D.
and others, 1951, 16 pp.

Pictures how handicapped have been able to
live normal lives. Illustrations on hold-
ing jobs, dancing, recreation, dressing,
doing housework, eating and carrying on
hobbies. Encouraging booklet for those
who have been handicapped.

Home Wiring for the Physically Limited --
Form 636, Pearle Waldschmidt, 12 pp.

Popular bulletin with safety suggestion
and correct working heights - illustrated.

Bibliography on Architectural Planning and
Construction for the Physically Handicapped-
Compiled by the Library revised May 1950.
Not annotated.

Reference List of Materials and Pamphlets
on Homemaking - by the Rehabilitation
Service, 1951. Sections I and II.

References listed by State or organization.
Not annotated.

Easier Housekeeping - No. FC 11-332
Clara N. Leopold, Feb. 1952, 9 pp.

Reviews work simplification principles
applied to homemaking. Advises home-
makers on how to take it easy. Use made
of research studies. References cited.

New Views in Cupboards - No. FC 11-222,
Muriel Smith, 14 pp.

A picture bulletin of Nebraska homes
showing good storage arrangements around
the desirable characteristics of visi-
bility, reachability, enjoyability,
workability and flexibility.

Slick Tricks for Easier Housekeeping -
No. FC 11-333, Clara N. Leopold, Feb. 1952,
10 pp.

Well organized check list that gives the
homemaker an opportunity to check "I do
this" or "I'll try this" for all major
homemaking activities.

University of New Hampshire
Mail Service
Durham, New Hampshire

Of Course Relax - Ext. Folder #11, Ann F. Beggs and Caroline Streeter Vooster, Feb. 1944.

A popular circular giving ideas on why and how to relax.

New York State College of Agriculture
Mailing Room
Department of Extension
Teaching and Information
Ithaca, New York

A Simple Way to Iron a Shirt - No. E629, Elaine Knowles Weaver. Revised by Dorothy N. Cousens. November 1952, 13 pp.

A picture booklet showing how to dampen and iron a shirt by a quick simple way. Bulletins published by other States have usually been based on this original work.

Centers for Your Work and Leisure - No. 811, Ella M. Cushman, May 1951, 15 pp.

A picture booklet with descriptions of work simplification made in New York homes at small cost with what one has. Examples include centers for baby care, sewing, children's toys, children's dressing and girls' study.

The Cornell Kitchen - Product Design Through Research - 1922, edited by Glenn H. Beyer. 92 pp.

An outstanding reference covering current thinking and knowledge. Reports on the research upon which design for kitchens, including human and technological requirements, may be based.

Functional Kitchen Storage - Ext. 846, Mary Koll Heiner & Helen E. McCullough, June 1948, 79 pp.

Findings from a research study that covers a wealth of data that will help anyone interested "building cabinets to fit the woman, build shelves to fit the supplies, build the kitchen to fit the family." Many other publications in this field are based on these findings.

Household Cleaning - No. E790, Jessie F. MacDonald & Lucille Williamson, Aug. 1950, 32 pp.

Comprehensive bulletin for homemaker including planning, fatigue prevention, and care of specific materials.

How to Make Cupboard Storage Devices -
Ext. Bull. 859, L. Leola Cooper, June 1952.
Detailed directions for making shelves,
racks, files, drawer dividers, sliding
trays, sink and towel racks and platform
on swivel castors.

Kitchen Cupboards That Simplify Storage -
Ext. 703, Mary Koll Heiner & Helen E.
McCullough (reprinted July 1951) 32 pp.
A popular presentation of research find-
ings reported in Exp. Sta. Bull. 846,
listed above. Well illustrated.

Oxygen Consumed in Household Tasks - Bull.
873, Esther Crew Bratton, Aug. 1951, 23 pp.
Reaching with the arms to a height of 46
inches above the floor consumed the least
oxygen, while reaching to the floor
required most.

Some Effects of the Height of Ironing
Surface on Worker - Exp. Sta. 833,
Flaine Knowles, May 1946, 57 pp.
A report on research with special atten-
tion to methods.

The Woman and Her Posture - No. E535 -
Helen Powell Smith (reprint 1950) 8 pp.
Popular bulletin appeals to homemakers
to do something about posture, and
describes what and how to do it. Skeletal
posture illustrations.

Self-Help Devices for Rehabilitation -
1-2-3-4.
A manual that describes and pictures the
many devices and gadgets on self care,
communication, transfer and travel, house-
hold equipment, adjustments and recreation
that have been tested by patients. Source
and cost information included. A useful
publication.

Self-Help Devices for Rehabilitation - 5
A separate publication presents articles
of general nature such as special clothing.

RX for the Disabled Housewife - 2.
Circular for leaders states that keys to
therapy are work simplification and human
ingenuity. Pictures devices for simplify-

New York University-Bellevue
Medical Center
Institute of Physical Medicine
and Rehabilitation
400 East 34th Street
New York 16, New York

ing 15 household tasks. Sources and a cost list for devices.

North Carolina State College
Publications Department
Raleigh, North Carolina

Easier Ironing for You - No. 372, Mamie Whisnant, Aug. 1952, 17 pp. booklet.

Popular bulletin describes and pictures ironing equipment and tools, arrangements of an ironing center; discusses attitudes and habits. Pictures show how to sprinkle and iron women's house dresses, men's shirts, children's dresses and curtains.

Let's Make Housekeeping Easier - Misc. Pamphlet 143, Mamie Whisnant, Dec. 1952, 15 pp.

Popular bulletin that describes many ways to make housekeeping easier and provides a check list.

University of Ohio
Office of Extension Information
Agricultural Extension Service
Columbus 10, Ohio

An Easy Way to Iron A Shirt - Ext. Bul. 319
Flaine Knowles Weaver & Marie Walters,
Feb. 1951, 7 pp.

Information on ironing boards and dampening clothes as well as shirt ironing.

Short Cuts in Housework - Leaf. L4, by
Home Economics Extension Staff, March 1951,
8 pp.

A check list of ways to plan your work, improve ways for doing work, share chores, keep fit and prevent accidents.

Take a Look at Your Posture - No. 244 Ext.
Thelma Beall (reprint Nov. 1950). 4 pp.

When you stand, walk, sit, reach, lift, carry, pull, push and jump. Illustrated.

Oregon State College
School of Home Economics
Corvallis, Oregon

A Guide for the Kitchen Planner - Bul. 482,
Maude Wilson, Sept. 1950, 34 pp.

A bulletin written for lay persons with information on how to plan, reminder lists, tables of information on sizes and illustrations of well designed kitchen arrangements and storage.

Kitchen Utility Wagon and Lap Table - Bul. 482, Mabel C. Mack, Jan. 1945.

Pictures and description of how to build.

Purdue University
Agricultural Publications Office
Agricultural Experiment Station
Lafayette, Indiana

Superintendent of Documents
U. S. Government Printing Office
Washington 25, D. C.

Planning a Center for Hand Ironing-Cir. 179,
Maude Wilson, Aug. 1949, 20 pp. booklet.

Details based on research suggests
alternate arrangements. Written for
homemaker.

Easy Ways - Ext. Bul. 391, Cleo Fitzsimmons,
Iva Goble & Gertrude Monhaut, 1953, 28 pp.

Explains work simplification and suggest
a procedure for solving a problem. Basic
classes of change charted. Original and
improved method of setting a table given
in detail. Summary of recent research in
homemaking activities and bibliography.

Smoother Ironing - No. 304, Gertrude Mon-
haut, 6 pp. leaflet.

Describes how to choose and arrange
equipment; how to dampen clothes and
ironing movements and pressure to save
time and energy.

Cut-outs To Help In Planning - Home & Garden
Bulletin No. 22, Dec. 1952. 30¢

Suggests how to start planning, provides
suggested floor plans and cutouts of
furniture, stairs, chimneys and other
planning aids drawn to scale of $\frac{1}{4}$ inch
equals one foot. Useful in getting ideas
down on paper.

A Pattern Motion Study - Home Management
Extension Committee - Home Management
No. 5, June 1945. Available in single
copies from Extension Service, USDA,
Washington 25, D. C.

Cutlines how to study motions using a
process chart, gives details of before
and after methods of preparing potatoes
for baking.

Em. Ch. Posture in Housework - AIS #83,
May 1949, 23 pp.

Charts of line drawings showing energy
required for various postures. Examples
of "this - not this" applied to housework.

Pots and Pans for Your Kitchen - House & Garden Bulletin No. 2, Elizabeth Beveridge, Aug. 1950, 31 pp. - 10¢

Reviews materials best adapted for cooking and what to look for when buying pans for oven use and utensils for range top use. Illustrated.

A Step-Saving U-Shaped Kitchen - designed by Lenore S. Thyre and J. Robert Dodge, Home and Garden Bulletin 14. Illustrated. Describes plans and pictures kitchen centers and motion and time economy arrangements.

Tools for Food Preparation and Dishwashing - Home and Garden Bulletin 3, Jan. 1951. 10¢
Helpful information on selection of kitchen tools including ease of operation and safety factors.

Your Farmhouse - Planning the Kitchen and Workroom - Home and Garden Bulletin 12, Helen S. Holbrook, Dec. 1951, 48 pp. 25¢
A complete guide for kitchen and workroom planning using work simplification principles, 16 plans, activity lists, and tables, on dimensions for equipment and storage. How to choose and care for floor and wall finishes and counter and table tops.

University of Texas
Agricultural Extension Service
College Station, Texas

House Cleaning Made Easier - No. C252, Bernice Clayton, 8 pp.
Well illustrated "how to do" bulletin with some suggestions on planning and equipment.

Simplify Your Work - No. L79, Florence W. Low, 4 pp.
Pictures six work simplification principles and suggests ideas on "backsavers" and how to keep from becoming overtired.

University of Vermont
Farm Bulletins Office
Morrill Hall
Burlington, Vermont

Seating Housewives at Their Ironing - Bu. B559, Marianne Muse, Feb. 1951, 68 pp.
A report of a research study that analyzes work simplification arrangements and types of chairs and other equipment, best adapted to the homemaker's needs when seated or standing.

The State College of Washington
Extension Service
Bulletin Department
Box 328, College Station
Pullman, Washington

Doing the Dishes - Ext. Bul. 465, Helen Noyes, June 1952, 12 pp.

A step by step picture bulletin. Adapted to interests and needs of girls as well adults.

A Motion Study of Kitchen Arrangements - No. X518, Elizabeth Weeks Wiley, Sept. 1950, 16 pp.

Report of a research study on placement of range, sink and stove in U-shape, two wall and broken U-shaped kitchen in preparation of a meal, serving, clearing away and dishwashing.

Storage for Your Home - No. B436, Helen Noyes, Aug. 1952, 15 pp.

Planning suggestions followed by detailed drawings and descriptions on storage in or for bedrooms, coats, children's needs, living and dining rooms, sewing, bedding, cleaning equipment, canned & frozen foods, business papers and garden tools.

When you Iron - No. B415, Helen Noyes, Mar. 1950, 12 pp.

Picture bulletin that emphasizes choice of equipment and arrangement. Suggests homemade arrangements.

A Motion Study of Laundry Arrangements - Sta. Cir. 142, Ruth A. Ayres et al, April 1951, 10 pp.

Describes methods and findings of laboratory study to determine suitable arrangements, equipment, washing method and convenience when handling a family wash.

Location and Counter Area Requirements of a Mechanical Dishwasher - No. B256, Anna L. Wood et al, June 1951, 19 pp.

Report of a research study on location of dishwasher under laboratory conditions using time and motion techniques required for stacking dishes on standard 24 in. work counter. Showed need for 36 to 40 inches adjacent to sink.

Wayne University
Department of Home Economics
Detroit, Michigan

Easy Does It No. 1 - 6 pp. leaflet. Pink.
Jan. 1952.

Easier Bedmaking with illustrations.

Easy Does It No. 2 - 6 pp. leaflet. Green.
July 1951.

Good Posture is easy posture for house-keeping. Illustrated.

Easy Does It No. 3 - 6 pp. leaflet. Yellow.
Jan. 1951.

Housekeeping with less bending, lifting climbing and reaching.

West Virginia University
Extension Service
Morgantown, West Virginia

Good Living Series 18 - Lesson No. 7 - Is Your Family Posture Conscious?, Eloise Cofer, 5 pp.

Reviews hazards to good posture, pictures good and bad posture of children at various ages and provides check list on general health conditions of family members.

Wisconsin Heart Association
Madison 3, Wisconsin

Kitchen Designed by Heart of Home Committee

One page poster describes plan that features minimum of reaching, stooping, bending, lifting and carrying, ease of maintenance and healthful atmosphere. Plans and specifications. 50¢

University of Wisconsin
College of Agriculture
Bulletin Mailing Office.
Madison 6, Wisconsin

Easier Washing - No. 43, Margaret F. McCordic and Louise A. Young, Jan. 1953, 17 pp.

Many work simplification methods and equipment described. Brings homemaker up to date on laundering.

Finding Time - Margaret F. McCordic, 16 pp. mimeo.

Discusses problems of human relationships and time management, lists causes of failure of time plans and how to schedule.

Simplifying Work - Margaret P. McCordic, 12 pp.

Explains how a homemaker may improve the method of doing work; illustrates posture, provides blanks for listing steps in present way of doing a job and improved method.

Woman's Club Service Bureau
16 East 41st Street

Don't Work Too Hard -

A discussion program kit for women's groups. Provides talks on: there may be an easier way; equipment and everyday supplies to save energy and whistle while you work. Two charts on easier way and cleansing agents included in kit.



The adjustable-portable kitchen is used to test height for working surface and also to demonstrate the use of the suction cup and one hand egg beater.

Popular Books about
THE HANDICAPPED

Compiled by Louise R. Miller, of the Montclair Library staff in 1952
using a 1949 compilation of the Trenton Public Library as a foundation.

F I C T I O N

B L I N D

Evans, David: IN BEAUTY LIKE THE NIGHT
(1949)

A blinded war veteran works out his
future, helped by a girl with musical
talent.

Graham, Winston: NIGHT WITHOUT STARS
(1950)

Well-written mystery in which the hero
is a partially blind war veteran.

Kendrick, Baynard: LIGHTS OUT (1945)
American soldier, blinded in Italy,
finally achieves normal, happy
existence.

Kendrick, Baynard: DEATH KNELL (1945)
A mystery solved by a blind detective.

Kendrick, Baynard: BLIND-MAN'S BLUFF
(1943)
Fascinating mystery featuring a blind
detective.

Kipling, Rudyard: LIGHT THAT FAILED
(1891)

A classic about a young artist
gradually losing his sight.

Knight, R.A.: FRIEND IN THE DARK
(1937)

A Seeing Eye dog story for young
people.

Robinson, M.F.: DEEPENING YEARS
(1950)

Character development among members
of a family in which the father is
threatened with blindness.

C R I P P L E D

Bristow, Gwen: TOMORROW IS FOREVER
(1943)

A terribly crippled man, through
courage and understanding is an
inspiration to those around him.

Burnett, F.H.: SECRET GARDEN (1909)
A children's classic of the physical
and spiritual regeneration of a
crippled boy and girl.

Craig, Dinah: LITTLE LAME PRINCE
A juvenile classic, in which the
hero's nobleness of character over-
comes all obstacles.

De Angeli, Marguerite: DOOR IN THE
WALL (1949)

For the nine-to eleven-year-old group,
this is an inspiring tale of a page in
the Middle Ages who overcomes a
physical handicap.

Deeping, Warwick: ROPER'S ROW (1929)
A lame man's wife and mother are
responsible for his readjustment.

De Leeuw, Adele: CLAY FINGERS (1948)
Wholesome teen-age story about a girl
with a back injury.

Du Maurier, Daphne: THE KING'S
GENERAL (1945)

The heroine leads a full, exciting
life, though chairbound from child-
hood.

D E A F E N E D

Field, Rachel: AND NOW TOMORROW (1942)

The heroine learns to accept her limitations, but is eventually cured.

D E F O R M E D

Oliver, Edith: DWARF'S BLOOD (1931)
A dwarf who became a painter.

Self, Margaret: COME AWAY (1948)
Handicapped by a speech defect, a boy finds his life worth living when he finds his special horse.

Webb, Mary: PRECIOUS BANE (1924)
Physical and spiritual blossoming of a girl with a harelip.

P A R A P L E G I C

Barton, Betsy: THE LONG WALK (1948)
Scene is laid in the ward of a veterans hospital caring for paraplegic war victims. Despair and courage are pictured.

P O L I O V I C T I M

Asch, Sholem: EAST RIVER (1946)
Struggles of a sensitive invalid to make good. A great book.

Barber, Elsie: TREMBLING YEARS (1949)
A college girl surmounts the psychological and physical problems encountered because of polio.

Beim, L.L.: TRIUMPH CLEAR (1946)
With Georgia Warm Springs as its locale, this young girl's story tells of her ultimate return to normal happiness.

C R I P P L E D (cont'd.)

Ertz, Susan: MARY HALLAM (1947)
In spite of loss of a pianist's career because of a hand injury, the heroine is regenerated in the end.

Forbes, Esther: JOHNNY TREMAIN (1943)
In revolutionary days a boy's aims in life were completely changed for the better after his hand became crippled.

Hugo, Victor: HUNCHBACK OF NOTRE DAME
Quasimodo, a hunchback, plays a leading part in one of Hugo's classics.

La Mure, Pierre: MOULIN ROUGE (1950)
Fictionalized life of a Frenchman who became a great artist in spite of a crippling accident in childhood.

Lincoln, J.C.: STORM SIGNALS (1953)
Stirring yarn of the sea and of a cripple who made good.

Marks, Percy: FULL FLOOD (1942)
The struggles of a humpback who with the help of some fine women gained the mastery of himself.

Maugham, W.S.: CATALINA (1948)
A miracle restores to a young woman the use of her leg. Scene: The Spanish Inquisition.

Maugham, W.S.: OF HUMAN BONDAGE (1915)
Famous novel about a youth handicapped by a deformity.

Molloy, A.S.: THE PIGEONERS (1947)
Boys in an orthopedic hospital are helped by their interest in the pigeons they see on the roof. For children.

Oemler, M.C.: JOHNNY REB (1929)
Cheerful, amusing romance of a crippled woman and her Civil War beau.

Salten, Felix: FORREST WORLD (1942)
Gentle story of a hunchback and the wild creatures who became his friends.

P O I I O V I C T I M (cont'd.)

Douglas, Lloyd: GREEN LIGHT (1953)
The influence of a really good man
regenerates a cripple.

Sawyer, Ruth: OLD CON AND PATRIC
(1947)
Children's story of a little boy
helped to adjustment by love, pets
and guidance toward a vocation.

T U B E R C U L A R

Golding, Louis: HONEY FOR THE GHOST (1949)
Escaping from a sanatorium, an ex-soldier
wins back health in remote Scotland, not
without some modern witchcraft.

Surmelian, L.J.: 98.6° (1950)
A young man's four-year recovery from
tuberculosis told in fiction form.
Boy-meets-girl brings a happy ending.

"out of the shadows
Turning towards the sun."

C R I P P L E D (cont'd.)

Stevenson, Dorothy: CROOKED ADAM
(1942)
Valiant war service of a crippled man.

White, N.G.: THE PINK HOUSE (1950)
Handicapped girl to whom happiness
came in the end.

Hayward, Du Bose: PORGY (1925)
A crippled negro beggar in Charleston.

N O N F I C T I O N

C R I P P L E D

Barton, Betsy: AND NOW TO LIVE AGAIN
(1944)
Because she herself became a para-
plegic, she can help other cripples
make new adjustments.

Carlson, Earl: BORN THAT WAY (1941)
Determined, brilliant, and friendly
this spastic rose from what was
thought to be imbecility to success
as a physician for others similarly
handicapped.

Harmond, J.W.: CHARLES PORTEUS
STEFINMETZ, A BIOGRAPHY (1924)
A badly twisted body made no differ-
ence in this brilliant immigrant's
outstanding contributions to the
science of electricity.

A M P U T E E

Baker, Louise: OUT ON A LIMB (1946)
She finds humor and joy in living with
only one leg; no self-pity.

Russell, Harold: VICTORY IN MY HANDS
(1949)
By getting busy at national jobs that
needed doing, as well as by acting in
a famous move, this war amputee be-
comes a useful, adjusted citizen.

B L I N D

Barry, H.M.: I'LL BE SEEING YOU (1952)
The personal story of a young man's
adjustment to sudden, total blindness.

C R I P P L E D (cont'd.)

Hathaway, Katherine: JOURNALS AND LETTERS OF THE LITTLE LOCKSMITH (1946)
Helps complete the picture presented in her earlier book.

Hathaway, Katherine: THE LITTLE LOCKSMITH (1943)
The inner life and difficult adjustments of an invalid, charmingly told.

Hinshaw, David: TAKE UP THY BED AND WALK (1948)
Sympathetic treatment of the work done at the Institute for the Crippled and Disabled in New York City.

Killilea, Marie: KAREN (1952)
Many doctors said the little girl, a victim of cerebral palsy, would never walk; but her persistent intelligent parents learned how to give her the expensive exercises, and accomplished a near-miracle.

D E A F F N E D

Calkins, Ernest: LOUDER PLEASE (1924)
A witty, intelligent young man achieves success in advertising despite almost life-long deafness.

Heiner, Mrs. M.H.: HEARING IS BELIEVING (1949)
She not only has been victorious over her own deafness, but has helped many others to do the same. A humorous, charming autobiography.

Warfield, Frances: COTTON IN MY EARS (1948)
It was many years before she would admit her impaired hearing; then a hearing aid restored her to normal, happy living.

B L I N D (cont'd.)

Bretz, Alice: I BEGAIN AGAIN (1940)
Though stricken in adult life this woman finds new happiness, dignity, and independence.

Chevigny, Hector: MY EYES HAVE A COLD NOSE (1946)
A blind man dispels sentimentality about his affliction and his guide dog.

Keller, Helen: STORY OF MY LIFE (1903)
A world-renowned woman whose bold, courageous spirit conquered total blindness and deafness.

Ohnstad, Karsten: THE WORLD AT MY FINGERTIPS (1942)
Triumph over affliction, and conquest of normality. Gay humorous.

Putnam, Peter: KEEP YOUR HEAD UP, MR. PUTNAM (1952)
When in college, a young man was accidentally blinded. Here he recounts his successful readjustments.

H E A R T C A S E

Harrison, C.Y.: THANK GOD FOR MY HEART ATTACK (1949)
Skillfully, the author, out of his own experiences can give encouragement without belittling the danger.

L E P E R

Martin, Betty: MIRACLE AT CARVILLE (1950)
Twenty years of the author's life have been spent in a Federal leper hospital. She writes of her treatment, her psychological development and her release.

P O L I O V I C T I M

Douglas, W.O.: OF MEN AND MOUNTAINS (1950)

One of the great men of our Supreme Court as a boy conquered polio through determination and courage.

Goldman, R.L.: EVEN THE NIGHT (1947)
How a man found happiness in the face of polio, deafness, and chronic illness.

Lawrence, Majrorie: INTERRUPTED MELODY (1949)

A present-day opera signer who refused to allow paralysis to end her career.

Linduska, Noreen: MY POLIO PAST (1947)

Account of a girl's long siege against infantile paralysis. Rather light treatment.

McIntire, R.T.: WHITE HOUSE PHYSICIAN (1946)

F.D. Roosevelt's physician writes about him.

Flageman, Bentz: MY PLACE TO STAND (1949)

Struck down with polio while on war duty the author was cured at Warm Springs. Reflexive, sensitive testimony.

Roosevelt, Franklin Delano

Any biography of F.D.R. tells of probably the most widely known victim of infantile paralysis in the world.

Rose, Anna P.: ROOM FOR ONE MORE (1950)

Heart-warming account of the rehabilitation of a child, tragically crippled in mind and body, who was adopted into a gay and living family.

Walker, Turnley: RISE UP AND WALK (1950)

Documentation of a man's harrowing personal experience; brave and touching.

T U B E R C U L A R

MacDonald, Betty: THE PLAGUE AND I (1948)

Hilarious as in "The Egg and I," she makes even a sanatorium amusing.

Reben, Martha: THE HEALING WOODS (1952)

A recovered patient tells of the curative powers of the Adirondacks and an understanding guide.

G E N E R A L

Herman, William: HEARTS COURAGEOUS (1949)

Short chapters on twelve well-known people who achieved in the face of physical handicaps. For teen-agers.

Rusk, Howard: NEW HOPF FOR THE HANDICAPPED (1949)

Rehabilitation of the handicapped from bed to job.

Yost, Edna: NORMAL LIVES FOR THE DISABLED (1944)

Timely and readable, full of stories of men and women who have overcome handicaps.

SOURCES OF EQUIPMENT
ADAPTED TO NEEDS OF HANDICAPPED
COMPILED BY
INSTITUTE OF PHYSICAL MEDICINE AND REHABILITATION
NEW YORK UNIVERSITY - BELLEVUE MEDICAL CENTER
400 EAST 34TH ST., NEW YORK 16, N.Y.

<u>Article</u>	<u>Notes</u>	<u>Sources</u>	<u>App. Price</u>
Adjustrite Chair	#RPC 1836 can be purchased with casters	Adjusto Equipment Co. 220 E. 42nd St. New York 17, N. Y. Att. A. H. Engelsen	\$21.00
Proctor Hi-Lo Ironing Board	Adjustable for sitting or standing and individual height.	Most department stores	14.00
Cover for Hi-Lo Board	Especially designed for this board	Most dept. stores	4.00
Sit-down Ironing Board	Sit down only	Most dept. stores or W.F. Meyer & Sons Chicago, Ill.	6.00
Proctor Cord-minder	To hold Ironing Cord	Most dept. stores	4.00
Proctor Combination Steam-dry Iron		Most dept. stores Proctor Electric Agent	22.00
Wheel Table	With or without shelf underneath	Most dept. stores or Handyman	7.00 & up
Sponge-type Floor Mop	O'Cello	Dept. stores	4.00
	Empire	Macy's & hardware stores	5.00
Long-handled Pan or Short-handled Lobby Broom	In sets or separately	Most dept. stores each Mail order stores set	2.00 4.00
Proctor Pressurmat	Automatic Pressure Cooker	Macy's, Proctor Electric Agent	30.00
One-handed Rolling Pin	Multi-roller	Miles Kimball Oshkosh, Wis.	1.69
Grip-tite Mixing Bowl	Stainless Steel Bowl	Macy's or most dept. stores	6.00
	Glass Bowl		4.00

<u>Article</u>	<u>Notes</u>	<u>Source</u>	<u>App. Price</u>
Stay-Cool Safety Spoon	Pair (two sizes)	Breck's of Boston 100 Breck Building Boston 10, Mass.	\$1.50 p.pd
Egg Separator	One-hand use	Macy's, most dept.	.35
Gravity Bin Dispensers for Flour		Most dept. stores	\$5.75
Evaporated Milk Can Opener	One hand	Pet Milk Company	Free
Wall-type Can Opener	"Daisy" Can-O-Mat Swing-away Rival Edlund #30	Dept. & hardware stores Edlund Mftg. Co. Burlington, Vt.	\$1.49 &.up
Strainer Lid	Draining foods one hand	Northmans, Highland Park, Ill.	1.29 P.pd
Plastic Bags	Varied sizes for storage of hard to handle articles	Dept., Variety, 5 & 10¢ stores	.20
Lazy Susan Refrigerator Trays	Can be used on cup- board shelves	Mrs. Dorothy Damar Treat Place, Newark New Jersey	
Floating Blade Vegetable Peeler	Two models available	Woolworth, Hardware, dept. stores	.20
Vegetable Graters and Slicers	One hand use, must make blades	Macy's	2.00
Cutting Board with Suction Cup		Houseware dept.	
One-hand Whip	Egg beater- beats whites stiff	Most dept. stores Bloomingdales	1.00 1.79
Sparkleen Glass Washee	Suction cup attach- ment	The Peck's Merchandize Mart, Chicago, Ill. or Breck's of Boston 100 Breck Building Boston 10, Mass.	2.00
Clip-on-apron		Mrs. Dorothy Damar Treat Place, Newark New Jersey	2.00

<u>Article</u>	<u>Notes</u>	<u>Source</u>	<u>App. Price</u>
Han-D Wash Board	For personal laundry	Macy's	\$.35
O'Celle Sponge	Varied sizes	Variety stores	.25 & up
Mitten-type pot holders	Extra protection	Dennison's Fifth Ave. or housewares	.50
Pick-up Tongs	To extend reach	Lewis & Conger 6th Ave. N.Y.C.	2.00
Mighty-Maid Mop Pail Dolly	For moving heavy objects	Mrs. Grace Edl. Middle Village 79, N.Y. Da-6 1681	
Combination Knife & Fork	Order left or right	Moore Engineering Co. P.O. Box 19065 Los Angeles, 43 Calif.	2.00
Cutting Board with Suction Cup with Pins	Stabilizes Roasts etc.	Large dept. stores	
Magnetic Pot Holders	Stick to anything made of steel	Magnex Inc. 845 Broadway, Denver Col. or anywhere	
Nylon Dish Cloth	No scouring	Dept. stores	(2) 1.00
Dennis-Mitchell Laundry Cart	To eliminate basket lifting	Dept. stores	4.95
Low Level Lap Board	Work surface on wheel chair	Home handy man	

WORK SIMPLIFICATION FOR THE DISABLED

Julia Judson, Coordinator
Disabled Homemakers Research Project
New York University
Bellevue Medical Center

As a member of the rehabilitation team our Disabled Homemakers Research Project at the I.P.M.R. is contributing to the objectives of all rehabilitation. That objective is to assist in the restoration of disabled people to the greatest physical, emotional, social and economic capacities that they can achieve within the limits of their disabilities. Naturally the process of rehabilitation runs concurrently with medical treatment to reduce the actual disability to its lowest point. Our emphasis is not on disability but on ability.

Our project was set up with three purposes: Research, patient training and teaching. The patient training is the most important factor for from it comes our practical information on the problems and suitable solutions in a previously neglected field. Dr. Gilbreth got the movement off to a good start when she interested the New York Heart Association in developing a program of work simplification for the cardiac homemaker. Although the largest single group of disabled homemakers do have heart trouble, a group equally large have orthopedic and neurological difficulties. The latter types constitute those who come to IPMR for rehabilitation. It is therefore in this field that we have made our greatest contribution.

Since our training is based on the needs of the individual the service we provide varies greatly. A young teen-ager may be concerned only with the care of her clothes. She needs instruction in the actual techniques of washing drying and ironing with the equipment she has at home or if that is not satisfactory for her needs she may need to be shown how to adapt it so she can use it--or even further it may be possible for her to get new equipment that meets her physical needs. We would like to help prepare such young ladies for the future when they may be married or self-supporting and living away from their families but our own time is limited and the girls themselves do not look that far ahead. We have been highly unsuccessful in interesting girls in something that seems far away.

On the other hand a young mother may be concerned with all the many housekeeping procedures and will be anxious for all the ideas she can get on simplified methods of work in all areas, in equipment she can use and in her kitchen plans particularly so that she can work with a minimum of effort.

There are all degrees of interest between these two examples. Men are as welcome as women for the situation may be such that it is feasible for the man to assume the responsibilities of managing the home or at least taking over some of the household tasks.

In regard to the comparison between home management for a disabled person and for the so-called normal we claim that the problems are the same only more so. Actually it is a matter of emphasis. The basic principles of good management apply in all situations. But whereas the average person has an objective in work simplification to save time and energy by saving motions so that she may realize some other personal objective, the disabled person may have to adopt the same principle simply to get the job done. The emphasis will vary too with the disability.

The cardiac will try to provide facilities that make it unnecessary for her to bend, reach, lift, carry and climb and to manage her time to avoid loads of activity and tension. These for her are a part of the therapeutic management of heart disease to eliminate undue strain on her cardio-vascular system.

A woman recovered from tuberculosis will also be interested in saving energy but she should be most concerned about management of time and selection of tools. In the early stages of recovery particularly she may be limited in the number of hours she may engage in any activity.

A woman paralyzed from the waist down and confined to a wheel chair will find that she can do anything and everything if work heights and storage areas are adjusted to the proper levels for her sit-down work.

Braces of various sorts may make it impossible for some disabled people to bend. Again work heights and location of storage facilities will be of paramount importance with reduction of steps running a close second.

Homemakers with hand difficulties--either weakness or loss of use of a hand will be interested first of all in small tools and techniques that will make meal preparation possible. They are rarely interested in broader considerations until the small but important skills have been mastered. It is to no avail to teach or demonstrate the value of a one-dish casserole meal if she cannot open a can or prepare the vegetables that go into it.

Many types of disabilities present more complicated problems of what can and cannot be done but this gives a general idea.

It would be wonderful if we and the patients had time for more complete home economics subject matter. It is obvious that it could be used. For those of you who are familiar with the various phases of home economics our work compares most closely to Extension work with our jobs comparable to that of Home Demonstration Agents. We work on selected projects with scientific work simplification as the guide to procedure.

Our case histories are actually a record of the families whys, whats, wheres, whens and whos used in motion studies. First of all these questions cover the general activities and after areas of study are sorted out, the same questions are applied to specific tasks.

A newly-acquired disability involves a great deal of personal adjustment in all areas of life. Under the circumstances we are able to catch adults in a period when they are most susceptible to change and our therapist who works with tuberculous patients has a motto: "You can be a better homemaker because of your disability." A thorough job of soul searching and reorganization is necessary in doing a good job of applying new methods. We find that a sizeable percent of the women who have a disability so severe that normal household activity seems beyond them are genuinely excited to discover that they can work again. Therefore our job of selling the idea of work simplification is not the problem, it is some other situation. We have found, too, that if the program is presented as something scientific or academic the response is discouraging. But in an atmosphere of informality the same facts and information can be given without a label and will be received in a spirit of sharing problems and solutions.

Now, to illustrate what we can accomplish by even the first steps in studying a disabled woman's job let us follow in part a typical interview. The conversation might run like this:

"What is one of the most difficult jobs for you to do?"

"I'm all tired out after I've made the beds."

"How many do you have?"

"One double and two singles."

"How do you make them?"

"Well after breakfast I go upstairs and take them apart to air. Then after the dishes are washed I go back and make them up. It always seems to take so much time."

"Why do you tear each bed apart every day?"

"Why, that's the way my mother taught me to. I've always done it."

"Did you ever think that in the old days in Europe bedding was different--less easy to keep fresh and clean and that all of us probably bathe more often than was convenient in the old days? Possibly you can do your beds a simpler way and still feel you are maintaining health standards."

"I suppose that's true. Maybe I don't need to completely remake the beds every day."

"Now, what about those children of yours? Couldn't they make their own beds before school?"

"Maybe, but I don't think that they would like to. They never have. I usually have to nag them even to get them off to school, on time."

"Before you go home to stay how would you like to have me see your children and your husband to talk over how they can help you best."

"I'll try to get them in sometime."

This sort of conversation will set the stage for many things. We have discussed the purpose of an activity and who can do it--or part of it. Later in a demonstration and practice of making beds an easy way to save steps the "how" of a new method is covered and the subject of when the best time to do it can be brought up again to save trips up and down stairs. Moreover it is an opportunity to bring the entire family into the picture.

Some unusual adaptations of the 20 principles of work simplification may interest you.

1. Use both hands to work--It is a fine way to exercise weak muscles. If grasp is lacking something like a loop on a broom handle may be used as we have done with some hemiplegics. If there is marked weakness in both arms or hands it may be necessary to use both hands to apply pressure--as in turning the crank of a can opener--a situation that can occur in polio or multiple sclerosis.
2. Lay out work areas within normal reach--Many times limitation of joint motion (as in arthritis) curtails even the normal "easy" reach in any direction. Narrow work counters then become very important--not merely a convenient way of saving motion.
3. Slide--and don't lift and carry. We follow this rule closely in arranging work centers. We always plan if possible for sliding pots from sink to range where filled pots must most often be transported. It is important for the woman on crutches, in a wheel chair or with weak arms.
4. Preposition tools--We encourage the hanging of small tools above narrow work counters out in the open as much as is acceptable to our patients. The idea seems to be fairly well accepted at preparation centers. We differ from many kitchen planning experts in prepositioning supplies around sinks. The sink is a center where it is very feasible to sit to work. However, if one is seated it is definitely inconvenient to get up to reach some needed item. Therefore we prefer to use the area over a sink for storage instead of the conventional window so it is possible to really have the things within easy reach.
5. Locate machine controls and switches within easy reach--Our machines are household appliances. We select appliances many times just on the basis of where the controls are located. A paraplegic in a wheel chair needs front controls. A polio wearing braces may be unable to bend so needs controls located higher.

6. A work place height that is right for the person and for the job-- Sometimes compromises must be made. Ironing from a wheel chair is a case in point. A 26-inch board may be the best for movement of the iron but the woman may have a poor sitting balance and must hold on to maintain her balance when leaning forward. This may give her only one hand to work with, therefore a higher position is selected so that she may sit back and use both hands at the job.
7. Use a clamp or jig--This is the basic principle of working with one hand from our hemiplegics, and arm amputees. It also applies where there is enough weakness so that two hands are needed to perform the work.

This is enough to illustrate my point. Let me go back to point out that all these principles are used in their pure form to save energy for the cardiacs and tuberculous patient.

The film strip I am about to show you gives a fair picture of how we actually proceed with a case.

This is what we try to accomplish. We use the tools of work simplification to help our patients work out a system of Home Management that will bring them and their families closer to their goals of satisfying living.

We have reached the point of being disappointed in visitors with no disabilities who leave without saying, "Why, this would be good for anyone."

A LIMITED SURVEY OF
RESEARCH STUDIES AND PERTINENT MATERIAL
BEARING UPON THE PROBLEMS OF THE CARDIAC HOMEMAKER*

by Ruth Cresswell Kettunen

Introduction

In submitting the material tendered in this paper, the writer has in mind giving some practical help to the person who is interested in teaching the woman with heart disease simplified ways of doing her housework. The systematic, practical yet scientific approach to methods of performing house-keeping tasks, is comparatively new. This approach received its impetus from Dr. Lillian Gilbreth, who with her husband, the late Frank Gilbreth, were pioneers in the movement in industry. The American Heart Association can be proud that Dr. Gilbreth chaired the subcommittee that developed the plan for the application of the principles of work simplification to the particular needs of the cardiac homemaker. It is hoped that those who teach these precepts will teach in such a way as to emphasize that techniques and improved methods are a means to an end, The end result desired for the cardiac homemaker is available strength and energy and time for her important job of homemaking. Dr. Gilbreth expressed this philosophy in the opening sentence of her book, The Homemaker and Her Job, when she stated "Homemaking is the greatest job in the world."

The idea for this survey developed as the writer was preparing to teach cardiac homemaker's classes in Michigan. In setting up the class program and selecting recommended practices to teach and demonstrate, it seemed that such teaching could only be done with confidence if more were known as to how such information had been ascertained. As the writer obtained such knowledge she found that she was teaching with more confidence and enthusiasm. It was felt that a comprehensive view of literature related to this problem would benefit the person making such a study, and it in turn might also be of great help, and a saver of time, to others planning to do similar teaching.

In starting, the first step was to consult faculty members in several departments at Michigan State College. Staff members in both the men's and women's physical education departments, the physiology, psychology, industrial engineering, and home management departments were interviewed. These interviews proved most helpful. Suggestions were given about studies in their particular fields that could be used and also information as to sources for finding such reports.

*A Report submitted to the School of Graduate Studies of Michigan State College of Agriculture and Applied Science in partial fulfillment of the requirements for the Degree of Master of Science, 1952. Reproduced by permission of author.

A day spent at the United States Department of Agriculture's Experimental Center at Beltsville, Maryland gave first hand information as to the research being carried on there in home economics projects. The personal interviews with the research workers at this center, as well as with members of the Home Economics Extension Staff in Washington, proved to be most helpful. Conferences with some doctors of medicine provided further useful information.

Letters were written to individuals through the nation and even to some in European countries who were known to be authorities on some phases of the subjects being surveyed. Response from these letters provided a variety of useful suggestions.

The main sources used for finding suitable research studies and other published material were bibliographies supplied or suggested by those authorities contacted, and such publications as The Journal of Physiology, The Journal of Home Economics, The Quarterly Cumulative Index Medicus, Notes on Graduate Studies in Home Economics and Home Economics Education, and the published lists in Doctoral Dissertations, were also used. Twelve unpublished master's thesis were reviewed, as well as reports of others found in professional journals and other publications. It was found that there was a very limited number of these research studies that could be used for this survey but other published articles and bulletins seemed to have a place in such a report.

As an attempt was made to use only recent publications, most of the material reported on has been published since 1940. Exceptions were made when the material had special significance to the problem.

The studies and articles reviewed have been categorized into nine sections with the publications listed chronologically in each section. The research studies and other published articles are classified as follows:

1. Work simplification, the principles and their application to housework.
2. Energy expenditure in various household activities.
3. Posture and correct body mechanics in relation to housework.
4. Fatigue with reference to the cardiac homemaker.
5. Vision and its bearing on the problems of the cardiac homemaker.
6. Research studies of specific household activities.
7. Kitchen planning.
8. Publications with reference to handicapped and cardiac homemaker's problems.
9. The heart, heart diseases, and treatment.

No attempt has been made to balance the quantity in the different sections. The writer reported on material she found available and thus some sections have much more than others. In some cases the articles reported here are similar, but by doing this the reader will have a variety of sources to refer to. The writer does not feel that these condensations submitted are complete in this particular field. They are offered as one possible source of help to the person

who is interested in teaching work simplification. It is hoped that this material will be used as a point of departure in gaining greater interest in the fields of research that have significance in teaching work simplification to women who have heart disease, or to other homemakers.

SECTION I

Work Simplification, The Principles and Their Application to Housework

Work simplification has been defined as a more effective way of doing a job that results in the use of less effort, less time or both. The principles of work simplification have for more than half a century been applied to the problems of industry. The present trend of the "American Way of Life" has been influenced by the industrial productivity resulting from the application of these principles. Yet it has only been for half that time that these scientific principles have been applied at all to housework. The precepts of work simplification used in industry and in the home are identical. It is only the goals that are different. In industry the primary aim of time and motion study has been to increase productivity for the sake of profit. In the home the ultimate goal is homemaking. As the homemaker applies these principles to house-keeping tasks and develops new and better techniques, the job becomes more interesting and time and energy are made available for her overall job of homemaking. The cardiac homemaker has still another goal. As she puts into practice these energy saving methods of doing her work, she learns how to meet the demands made upon her in her home in such a way as not to overtax her incapacitated heart and this change can mean life itself to her.

For the reader who wishes more complete information than the articles in this section give, the texts listed below are suggested.

Mundel, Marvin E., Motion and Time Study
Prentice-Hall, Inc., New York, 1950

Grose, Irma H. and Crandall, Elizabeth Walbert
Home Management in Theory and Practice
Ch. 6 and 7, F.S. Grofts and Co., New York, 1947

Nickoll, Paulena and Dorsey, Jean Muir
Management in Daily Living, Ch. 11, 12 and 13
John Wiley and Sons, Inc., New York, 1950

There are six abstracts in this section. Four of these came from research done at Purdue University. One of the Purdue publications, Easier Homemaking, brings together the results of much of the work done there in a practical presentation. An additional article gives a brief general view of work simplification. Finally, there is included in this section a bulletin, Household Cleaning.

It is not the purpose of this survey to include subject matter bulletins that give instructions for doing special jobs because State colleges, the educational divisions of many commercial companies and the United States Department of Agriculture provide a wide variety of such information. This bulletin, however, is included as an illustration of presenting such material in a way that stresses that the prime factor in cleaning is to save energy for the homemaker.

(Gross, Irma H., The Theory of Work Simplification, Kelvinator Kitchen, Detroit, 1944)--During the period of World War II, farm management and home management specialists followed the lead made by industry of utilizing easier and quicker methods of work. The name of the movement toward decreasing effort went through various changes, finally evolving the title of work simplification. In research in work simplification the worker on the job is observed and then improvements are sought in the detailed elements of the job. Special process charts, operation charts, stop watch techniques and a kind of short-hand symbols called "therbligs" are employed. A film of the job is taken and then the process can be analyzed in even greater detail. The number of household and related tasks that have been studied are very limited. Those known to the author are washing dishes, preparing lettuce cups, preparing spinach for cooking, preparing mashed potatoes, peeling tomatoes under factory conditions and some analysis of janitors' cleaning tasks. The homemaker can use the results of these studies to find easier methods of doing a particular task and can apply the principles of work simplification to her own job. It is necessary to know these principles. Time is lessened on a task by reducing the number of motions, having more effective motions or both. There are five classes of changes possible: changes of body motions and position, changes in tools and equipment, changes in production sequence, changes in finished produce and changes in raw material. Some searching questions chiefly in relation to Class I changes are: can you cut down on the number of motions; can you combine motions by prepositioning; can you simplify work by changing the direction of your motions; can you change the kind of motions used; and can you reduce work by using both hands at once? In adopting a program of work simplification for one's self the first step is to see some reason for so doing. Second, it is necessary to recognize that changing old habits is not a quick nor a particularly easy process. Attack the new habit boldly and keep with it until it becomes an old friend. After this, ask why do I do the job; can I do it in a more convenient place; can I get better tools; am I using the best tools I now have; is my body position comfortable; or could I use my hands more effectively? Accepting such suggestions points the way to becoming more motion-minded. This state of mind is not a goal in itself but a constant incentive to newer, more interesting and more effective ways of accomplishing everyday tasks.

(Goble, Eva L., Techniques of Work Simplification, Kelvinator Kitchen, Detroit, November 1945)--Techniques of work simplification are important in home economics because they offer a scientific means of studying household tasks. The productivity of the homemaker's labor is best measured in terms of her contributions to family living and work simplification becomes of major importance in terms of her productivity.

The first step in work simplification is to become motion conscious. Six guides to apply to make a job easier are to ask: is the job necessary; can it be combined with some other task or the two done at once; can the task be done while seated; are the tools to use within easy reach; is it possible to use both hands to work; and is this the best tool for the job?

The second tool of work simplification is the use of special charts. The process chart is a step by step description of the procedure used in doing a task. The process chart teaches the user to think in terms of the "flow" or movement of work. As a tool for analysis, it is one of the most useful for rough screening of excess travel and repeated effort. Further screening of waste motion can be obtained by the use of an operation chart. In this, the movements of the operator are broken into the activities of the right and the left hand. In the final analysis micromotion techniques are used. This works best when the task can be localized and a motion picture taken. The picture is then studied and analyzed. A special clock provides a device to have time readings for the movements recorded in the film. Each motion is analyzed from this film and the motions are described in terms of therbligs, a system of terms developed by the Gilbreths, pioneers in motion study. After this analysis the elements are transferred to a simo-chart on which each therblig is given an identifying color. This simo-chart is an aid to spotting places in a process or operation where movement is excessive or where "delay" needs study. Micro-motion is exacting and requires elaborate equipment but the process and operation charts are simple to use and require no special materials. Therefore the latter are good devices for use to promote more efficient kitchen operation.

(Holbert, Helen Elizabeth, The Adaptation of Work Simplification Methods to Household Activities, Master's Thesis, Purdue University, Lafayette, 1945)-- The introduction of this study provides a thorough and scientific discussion of work simplification in its relation to homemaking. The body is the most effective tool for effecting work. Since the body is a standard tool, then the problem in the home consists in finding the movements best suited to accomplish work. The study of and the understanding of body mechanics is necessary. The author uses charts and drawings as aids in providing this understanding. The common techniques of motion and time studies are not extensive enough for the study of household activities which involve much body movement with changes of position and place. Since the available means were not adequate, the author worked out further methods of work analysis and those were applied to the task of bedmaking. The new method of bedmaking resulting necessitated a change of bedmaking method, changes of bed height, and of working techniques. This method is illustrated by photographs, drawings and detailed process charts. The author concludes that because of the common bed design a great deal more energy is utilized in bed making.

This new method may not be practical under conditions other than those she established for the study but the working techniques (use of human tool methods) are easily applied under most conditions. The purpose of the study has been to shift from the objective outcome of industry; that is, increased production and time saving, to the objective outcome of effort saving. Engineers have designed machinery and tools that work effectively and efficiently but much

work output necessitates the addition of the human tool so it is important to consider it with the machine.

(Mundel, Marvin E., Easier Housekeeping, Life Magazine, September 9, 1946)--This article Reported Research of Janet Armstrong Under the Direction of Marvin E. Mundel, shows the basic principles of work simplification applied to kitchen tools, kitchen arrangements, cleaning and bedmaking. To help visualize the researcher's findings, multiple-exposure photographs were taken of experimenters doing household tasks with small light bulbs attached to their hands. This process traced the pattern of the working motions in streaks of light. By showing the poor and the improved methods, the reduction in streaks of light in the improved method shows dramatically the economy of movement. Six rules for efficiency in the home are given. These rules are: eliminate all unnecessary parts of a job, keep everything within easy reach, use the best tool for the job, use both hands to work, combine two jobs into one, and sit down to work. Six steps are given for making a bed in an improved way. A photograph illustrates each step. Essential kitchen tools are pictured, grouped around each basic piece of equipment (range, refrigerator and sink) where they are most used and near which they should be stored. Nine pictures illustrate a selection of gadgets that are rated as a good choice and similar ones considered poor. Four questions are given that should be asked when evaluating a gadget; is it easy to operate; does it require a special skill; does it save time, counting the time necessary to get it out, clean it and put it away; can it be used for more than one job; does it warrant the space it takes up? Rules for ironing a shirt are given that can save 50 percent of ironing time (as worked out at Cornell University). It was recommended that the worker sit with the underside of the ironing board two inches above the thighs. The board should be covered with asbestos and should be approximately two feet wide. Life Magazine asked the Motion and Time Study Laboratory of Purdue University to do this piece of research reported here, believing that a housewife's work can be simplified through scientific analysis.

(Mundel, Marvin E., Easier Homemaking, Experiment Station Bulletin No. 529, Purdue University, Lafayette, 1948)--The purpose of the project reported was to apply work simplification principles to various aspects of kitchen arrangement, house cleaning methods and bedmaking procedures. This publication approached the problem from the practical viewpoint, realizing that each home is individual and must be treated as such. However, there are six principles that can be applied to any house and to any worker. Basic suggestions are given for making housework easy. There are various ways of recording original and improved methods of doing a job and in this study, process chart-man analysis, flow diagram, right and left hand operation chart and micromotion study were used. Kitchen shapes and arrangements show that the "U" shaped kitchen is the best plan for economy of time and economy of distance traveled. As a result of research, a list of essential kitchen tools and small equipment are given that should be placed convenient to each kitchen work center. Various tasks have been studied and improved methods are given for ironing, making a bed, washing woodwork, cleaning a bedroom, waxing floors, dusting, mopping and dish-washing. Household gadgets were evaluated and a check list given. Gadgets were

classified according to their efficiency. A floor plan is given for "The Kitchen of Tomorrow." Process charts were used in an analysis of meal preparation and these results showed that a person would walk only 116 feet in preparing a meal in this kitchen and the same preparation would require 448 feet of walking if done in the conventional "U" shaped kitchen.

(MacDonald, Jessie Freeman and Williamson, Lucille, Household Cleaning, Extension Bulletin No. 790, Cornell University, Ithaca, August 1950)--This bulletin outlines the problems of household cleaning and then gives a variety of special and specific directions for care of special surfaces. The authors' approach to the problem of housecleaning is that help should be given to the homemaker to aid in reducing the amount of cleaning and the effort necessary to do it. The amount of cleaning a homemaker does will be determined by her own and her family's standards as well as other responsibilities, help available from other family members, her health and various resources available to her, such as money, equipment and commercial services. As these conditions change, so will her care of the house change. Each homemaker must decide for herself how much cleaning she will do, when, how frequently and what methods she will use. A flexible plan for cleaning best meets the needs of most households but one should look ahead and plan to make the job easier and more interesting. The annual cleaning often leaves the homemaker physically and emotionally exhausted, so it is suggested that the special cleaning jobs be distributed over a period of time. To make cleaning easier, plan ways of keeping dirt out of the house, plan for adequate storage spaces, select suitable supplies and equipment and select surfaces that are easy to clean.

Preventing excessive fatigue is a primary consideration and since all cleaning involves muscular activity, the best possible use of muscles is important. Frequent short rest periods between heavy jobs prevents excessive fatigue and it is also a good plan to alternate easy and hard jobs. The care of specific surfaces given in the bulletin give a wide variety of aids to better house-keeping.

SECTION II

ENERGY EXPENDITURES IN VARIOUS HOUSEHOLD ACTIVITIES

A very limited number of research studies are available that give specific information that can be applied to the problem of saving energy when performing household tasks. In the other sections of this survey, in most cases only the most recent studies and publications have been included, but in this section reports of the first studies reported are included. This has been done because of the fact that the work of the more recent research workers used these original studies as a basis and then carried on their investigations from the point where the first studies ended. All articles in this section are research findings. There are ten articles condensed and they indicate the progress of research in this field.

The important fact to remember when considering the results reported is that regardless of the scope and accuracy of the research, energy measurements cannot be taken as a positive measurement that applies to everyone. There is a great variation between persons, and thus there are different energy costs for different individuals doing the same tasks. Even the same individual uses different amounts of energy to perform the same task at different times. Changed emotional factors, fatigue, and changed environmental factors are the cause of such differences. For this reason energy measurements should be used with discretion. If one uses such information, accepting the possibility of rather wide variations due to these factors, then energy measurements become an excellent tool for pointing out the importance of effective body motions as a way of saving energy.

Energy research can be much better understood and interpreted if one has a thorough knowledge of the methods used and equipment necessary for doing this type of research. The texts listed below provide such information.

Rose, Mary Swartz, Foundations of Nutrition; pp. 7-19
The MacMillan Company, New York, Revision 1944.

Chaney, Margaret S. and Ahlborn, Margaret, Nutrition,
pp. 34-49, Houghton Mifflin Company, New York, 1949.

(Benedict, Francis G. and Johnson, Alice, Energy Loss of Young Women During the Muscular Activity of Light Housework, American Philosophical Society Proceedings, Vol. 58, 1919)--The authors state that it is generally considered that the muscular activity of the average woman is less than that of the average man. However, housework in some form still remains a not inconsiderable factor in the muscular activity of most women and exact information as to the energy needs for the performance of duties of the household is essential for computing the daily requirements of the average woman. Their experiment to provide this information was done with 200 young women undergraduates from Simmons College as subjects. The number of women tested in each experiment varied from 14 to 25. A respiration chamber was used that was large enough to seat from 30 to 40 persons. The standard value or base line was established with the subject sitting quietly reading and this was estimated to be not far from 10 percent higher than the true basal. The percent of increase over this base line was as follows: for reading aloud, 3 percent; standing quietly, 9 percent; hemming, 13 percent; singing, 22 percent; dusting, 134 percent; and sweeping, 150 percent. One experiment on walking indicated that when walking at 1.08 miles per hour the energy cost was 62 calories per mile. Many of their observations with slightly faster rates gave values from 40 to 60 calories per mile. The authors feel, however, that too little evidence is available to indicate whether walking at a slow rate of speed is uneconomical. This figure (62 calories) compares with the value commonly quoted from German sources for walking one mile at moderate rate.

(Langworthy, C.F. and Barott, H.G., Energy Expenditure in Household Tasks, American Journal of Physiology, Vol. 52, 1920)--The office of Home Economics, United States Department of Agriculture investigated various factors affecting

men and women in the expenditure of energy. This article presents the results of some of those studies of energy requirements for the performance of several household tasks. The respiration calorimeter was used to measure energy and one 22 year old woman was the subject. Measurements of energy expended while resting, sewing, dressing an infant (model), sweeping a floor, washing a floor, washing and ironing towels, and dishwashing were measured. The dishwashing was done at three heights and the corresponding variation of energy expenditures were noted. A variation of 15 percent in height of table caused an energy expenditure of from 20 to 40 percent increase, the low table requiring a higher percent of energy from its user. The observed increase of heat elimination well illustrates the importance of choosing equipment to "fit" the worker. Of the 53 tasks performed, light tasks such as sewing, crocheting and knitting required an average of nine calories per hour more than sitting. Harder work such as sweeping and washing towels by hand increased energy expenditure 40 to 50 calories per hour over sitting.

(Langworthy, C.F. and Barott, H.G., Energy Expenditure in Sewing, American Journal of Physiology, Vol. 59, 1921)---For a number of years the office of Home Economics, United States Department of Agriculture included the use of the respiration calorimeter for investigations of energy required in the performance of household tasks. This article reported the results of a special study of hand sewing and machine sewing. This series consisted of 43 experiments made with one subject. The subject was a woman 28 years old. Little variation was found in the energy required for hand hemming of fine handkerchiefs, cotton sheets and 8-inch cotton duck. The amount of energy was from 5.5 to 5.8 and 4.3 calories per hour was the surprisingly low figure for hemming army blankets. When the sewing machine was used it took six times as much energy per hour as doing the same work by hand but the energy per meter of sewing was hardly one-half as great. Sewing on a motor driven machine required about one-fifth the amount of energy as compared with the energy used with a foot driven machine. The tests showed that the size and weight of the material sewed had little effect on the energy used. In respect to the accomplishment and economy of energy, the motor driven machine appears several times more economical than the foot power machine.

(Benedict, Francis and Parmenter, Hazeltene Stedman, The Energy Metabolism of Women While Ascending or Descending Stairs, The American Journal of Physiology, Vol. 84, 1928)---The authors felt that knowledge of energy requirements for ascending and descending stairs had a practical value for the use of physicians and the physiologists. To obtain this knowledge the authors used a respiration apparatus that could in a large part, be carried by the operator rather than by the subject. The experiment was conducted at Mount Holyoke College, South Hadley, Massachusetts. Twelve young college women were the subjects. The amount of energy consumed was measured. Oxygen consumption during horizontal walking and during ascent and descent of stairs was measured. For practical purposes the findings of this study can be expressed as follows: in walking up one flight of steps (15 steps each 20 cm. high) the average person expends the same amount of energy as he does in walking 15 times the distance on the level. The average person uses five times as much energy to descend stairs as to walk on the level the same distance. In measuring horizontal walking it was found that walking at

34 meters per minute used 0.64 calories per horizontal kilometer, walking at 65 meters used 0.52 calories and walking at 89 meters per minute used 0.67 calories. In these figures the calories used for standing have been deducted. These values indicate that the optimum rate of walking is about 65 meters per minute and sauntering is uneconomical of energy use.

(Swartz, VeNona, Human Costs of Operating a Vacuum Cleaner at Different Speeds, Journal of Home Economics, June 1929)---The purpose of this study was to increase the meager knowledge in the field of human energy costs of household tasks and to find specifically the speed of operation for the Hoover vacuum cleaner most efficient from the point of view of expenditure of human energy. Indirect calorimetry was employed and a Douglas bag was used to determine energy cost. The study included intensive study on one subject and a confirmatory series on nine other subjects. Results show that total energy cost increases with increased speed when operating a vacuum cleaner. A speed of not more than one foot per second was judged to be the most economical for operation of a cleaner of this type.

The review of literature pertaining to energy costs indicated that 1919 was the earliest that any study has been made on energy expenditure in household tasks. Studies reviewed classified housework as light, moderate and strenuous. In light work were grouped reading, singing and sewing. These increased metabolism over sitting about 24 calories per hour. Strenuous work included washing, scrubbing and sweeping. These increased energy expenditure about 50 calories per hour. Besides the economy of energy at slow speed, the author concludes with the information that previous research in the Hoover laboratories showed the cleaning efficiency was as good or better at the slow speed of operation.

(Page, Richard M., Measuring Human Energy Costs in Industry: A General Guide to the Literature, Genetic Psychology Monographs, Vol. XI, Clark University Press, Worcester, Massachusetts, 1932)---This work represents a careful and thorough review of the literature pertaining to measuring energy costs. It is directed toward enlarging one's information on effects of muscular activity, recovery from such activity, and fatigue factors on energy consumption of individuals. Because there was no general manual in English available that gave information on methods of measuring energy costs, apparatus used or results in the field of measuring energy costs of human work, this work was prepared to provide such information to industrial engineers and industrial psychologists. This monograph is only a guide to the literature in this field but it includes information on equipment and apparatus used in measuring energy and covers application and results. Research in energy costs for body actions and household tasks are included. Studies in fatigue are also included. The accompanying bibliography is complete and points to the fact that research in this area is not extensive.

(Swartz, VeNona W., The Human Energy Cost of Certain Household Tasks, Agricultural Experiment Station Bulletin No. 282, State College of Washington, Pullman, June 1933)---The purpose of this study was to extend the work previously done by other research workers in measuring energy costs of housework. Oxygen

consumption was measured with a Benedict knapsack apparatus and the results reported in calories per square meter of body area per hour. A variety of household tasks were measured and summarized in a graphic statement. Energy costs were also expressed in percents above energy used when resting. No measurements were made of fatigue arising from the tasks but the author feels that such would probably be roughly proportional to the energy expended. From 2 to 7 women subjects were used in each test. Laundry tasks consumed the most energy. Hanging clothes from the floor used 184 percent above resting, rinsing clothes 161 percent, hanging clothes from a table 118 percent, wringing clothes with electrical extractor 125 percent, wringing with an electric wringer 99 percent, ironing standing 79 percent, ironing sitting in a chair 62 percent, ironing using a rotary electric ironer 45 percent, kneading dough at high table 116 percent above resting, and at low table 133 percent. Mixing batter was 50 percent above resting and the table level did not affect the energy used. Peeling potatoes used 45 percent over resting when standing, 43 percent sitting in a chair and 54 percent sitting in an uncomfortable position on a high stool. Tests indicated that weight of the iron used when ironing had little bearing on the energy used. The study showed that there was much variation between persons in the amount of energy they used to perform the same task. In the test for ironing while seated, the surface had to be relatively higher than when standing and the author felt that a lower surface would have further reduced energy consumption.

(Morey, Nancy Booker, The Energy Requirement of Farm Women, Journal of Home Economics; January 1936)--The purpose of this study was to secure data on the energy intake of farm women. In doing this all available data from known sources were collected that gave energy costs for household tasks. The figures given all allow for the energy required for maintenance and effect of food in addition to the energy required for the activity itself. When the original study from which the author uses such findings was stated in different terms, the data were recalculated. Material from ten different energy cost studies was assembled and was expressed in energy expenditure of average calories per kilogram per hour for different household tasks. This summary of energy costs indicates that body motions and activities and household tasks vary widely in energy costs. The author used the known energy costs of different single operations and then from these estimated the energy costs of larger operations and activities. By this method, she found that clearing away and washing dishes used 2.95 calories per kilogram per hour, washing clothes 2.94, care of children 2.93, preparing meals 2.48 and care of house 2.46 calories per kilogram per hour. The activity reported that was the most costly in energy use was sweeping a rug with a broom. This used 4.38 calories per kilogram per hour.

(Hoover, James Edward, Analysis of Variations of Human Energy Consumption with Length of Movement Under Equal Pace, Master's Thesis, Purdue University, Lafayette, 1950)--The introduction of this thesis gives the viewpoint that it has been known that different tasks require different amounts of human energy and that energy expenditure could be measured by the oxygen consumption of the person doing the task. This is not enough. We need to determine the differences in energy expenditures for differences of performance on the same job. It is

known that a person may increase his rate of speed but still this does not show what relation this rate of speed has to the energy expenditure. The main purpose of this study was to prove valid or invalid the supposition that pace of work is related to the amount of energy expended in doing the work and that energy expenditure will increase proportionately to pace. A reasonable sample pace that had been determined in previous work by Mundel was selected. A full arm movement was selected to measure. Nine male students at Purdue University were selected as operators and nine tests were made on each operator. The Sandborn Metabolator was used to measure oxygen consumption. The results of the study prove valid the supposition that pace is directly related to the amount of human energy expenditure in doing work, with the increase of rate increasing the amount of energy used. Pace is defined as the observed rate of acceleration. This finding of the author holds forth many possibilities for comparing the activity of two or more people doing the same job and aids in establishing the rate of a person for doing a job.

(Bratton, Esther Crew, Oxygen Consumed in Household Tasks, Agricultural Experiment Station Bulletin No. 873, Cornell University, Ithaca, 1951)--The purpose of the study reported was to determine the energy expenditure in activities common to the performance of household tasks. Eight activities were selected and nine young women (homemakers) were selected as subjects. Energy was measured in terms of the amount of oxygen consumed. Some significant findings were that in comparing reaching at a level of 46 inches to reaching at a level of 56 inches, the latter required twice as much energy. Reaching 72 inches required four times as much energy as reaching 46 inches and reaching 3 inches from the floor required nineteen times as much energy as reaching at the 46 inch height. The "knee bend" position of stooping to the floor consumed 547 cc. of oxygen as compared with 312 cc. for the trunk bend action. The energy cost of each tested activity was comparatively small but because these activities are the type commonly used in work centers and with appliances and commonly used for several hours each day, they deserve consideration as a possible way of saving energy. The importance of energy cost does not imply that the use of energy is detrimental to the body. Energy costs must be weighed against other costs, as in the trunk bend, that compresses internal organs and distorts back alignment. In comparison, the "knee bend" uses more energy but this action is still recommended by specialists because it involves the large strong muscles of legs and thighs and permits the trunk to be held straight. Women do not realize how much they lift when they pick up a small object. It is the lifting of a large portion of the body that makes the effort. The information contained in this study has many practical implications for homemakers in their use of equipment of traditional design.

SECTION III

POSTURE AND CORRECT BODY MECHANICS IN RELATION TO HOUSEWORK

Body posture and effective body actions are closely related. In teaching work simplification a challenge lies in this area. It is very easy for too much emphasis to be placed on such things as "model kitchens", automatic equipment

and special tools and gadgets. There is a dramatic appeal in the use of new mechanical appliances and writers, advertisers and manufacturers are constantly keeping them in the foreground. The teacher must be aware of the possible harm of such an approach. Planning of kitchen units and the use of new equipment and tools should be considered as to their importance in providing the homemaker with ways of using her body that saves energy and employs good postural practices.

Physiologists, medical doctors and physical education authorities are generally agreed that the first step in effective use of the body is correct body posture.

The first bulletin in this section is distinctive in that the writer found it to be the first comprehensive publication that applied correct posture to household activities. It is the original bulletin used in developing the charts used in the United States Department of Agriculture bulletin, Posture in Housework.

The material condensed in this section is varied in content. Of the nine abstracts, three are reports of research and four are publications that give important facts about posture. One of these is the German bulletin mentioned above. There are, in addition, two articles included that are presented from a "popular" standpoint because they may stimulate general interest in the importance of good posture.

(Villwock, G., Hausarbeit Leicht Gemacht, (Housework Made Light-- English translation), Hauswirtschaftlicher Lehrdienst des Reichsaratoriums fur Wirtschaftlich Keit, Y. Vortrag, 4th Edition, Berlin, NW 70, 50 RM, 1934)--This German publication is a practical presentation to housewives of the fact that it is their duty to use their bodies wisely. Warnings are given as to what not to do in the use of the body when performing various body actions and household tasks. The author warns one to avoid stooping and bending and then contributes this practical application, "To those who find bending very difficult, namely, older women who suffer with rush of blood to the head, it can safely be advised to drop to one knee. When only short work times are involved, one need not fear harm to the knee Young women and girls will naturally scarcely be inclined to kneel since it is less difficult for them to bend over quickly once." This bulletin contains 20 sketches or charts that illustrate the body positions such as: lying down, sitting, standing and stooping to the floor. The comparative efforts are given as follows: sitting requires four times the effort of lying down; standing twelve times the effort of lying down; and stooping fifty-five times the effort of lying down. Practices of good posture are applied to care of floors, hanging clothes, thorough cleaning and dusting. Sitting at housework and correct work levels for sitting and standing are stressed as well as safety practices when doing housework.

(Knowles, Eleanor Elaine, Relation of Posture to Fatigue in Ironing, Journal of Home Economics, November 1945)--The purpose of this study was to investigate the causes and effects of fatigue in the performance of household tasks. Ironing was selected because it involved repetitive processes and

therefore seemed to lend itself more favorably to intensive study. Twenty-three homemakers were observed in their homes during one or more ironing periods. Through watching these women poor posture was observed to be as a result of ironing boards that were too low. The metabolic, respiratory and heart rates, her postural balance and force she exerted on the ironing board were measured for each of the women. Motion picture analysis was also used to show the effects of poor ironing board heights on posture. All tests showed a marked rate of increase in responses when they ironed at a board too low as compared with a board of the preferred height. The author consulted physiologists to establish the fact that work done in the home is not sufficiently strenuous to bring out changes in the character of products of metabolism. Ironing is classified as light moderate work but this study showed that certain body processes were noticeably higher when they worked at heights that caused poor posture. This study shows that a desirable height for the ironing board cannot be established by any rule of thumb method. More fundamental than body height are such factors as fullness of upper arm and of vision. Efficient performance of any major household task makes necessary equipment which is either adjustable or with wide variety of measurements and some understanding on the part of the homemaker of the importance of the need of equipment suited to her body proportions.

(McCordic, Margaret P. and Denniston, Helen, Make Work Easier, Extension Service Circular No. 365, University of Wisconsin, Madison, November 1945)---Efficiency engineers and factory workers have studied motions and improved jobs. In the same way women can study their motions and improve their methods, avoid strain and develop and keep good carriage. Some of the basic principles about movement and posture that apply to all work and that are listed in this bulletin are: work while standing is best done with feet apart for a broad base and easy shift of weight to allow for a wide range of movement; point the toes straight ahead to prevent strain on the ankle and instep; pull the abdomen up and hips down to hold the pelvis steady as a base for the spine and lift the breast bone to allow heart and lungs plenty of room. A circular arrangement of equipment and supplies makes them easier to reach when reaching is necessary. Energy and time can be saved by taking one long step instead of several shuffling steps. Fifty photographs apply and illustrate these stated principles to a variety of household activities and farm and garden activities as well. Such body actions as standing, climbing stairs, sitting in a chair, bending, pushing, lifting and relaxing are shown.

Detailed description of the best way to relax suggests that one should relax in a quiet room with a dim light, all clothing should be loose, anxieties must be forgotten and pleasant thoughts deliberately chosen. Learn to relax in a backlying position. Draw the muscles of the abdomen so that they feel hard to the fingers, then let them soften. Repeat this to achieve a feeling of relaxation. This ability to relax can be practiced until one is able to keep parts of the body relaxed while other parts work.

(Kain, Ida Jean, Sitting Pretty on the Job, Kelvinator Kitchen, Detroit, February 1949)---The author, a newspaper columnist, approaches the problem of improving posture in housework. The only way to lessen fatigue is to apply

scientific principles of body mechanics not only to housework but also to all everyday movements. Housework can be turned into good exercise with the right body mechanics. In applying correct body mechanics, the strain of a task is distributed over several sets of muscles. Correct bending saves your back. Stand and sit as "tall" as possible without strain and that points to the importance of correct working surface heights. Sitting takes far less energy than standing. Scrubbing floors is good exercise but takes a considerable amount of energy so the busy housewife had best save her strength. Housework done in perfect posture affords exercise and saves the figure but as prolonging housework to streamline the figure, that is a roundabout way to clean the house or fix the figure.

(Posture in Housework, Extension Service Bulletin AIS No. 83, U.S. Department of Agriculture, May 1949)--This publication uses material assembled from a variety of sources. It includes tables and diagrams to show the energy expenditure per hour under different conditions of muscular activity. Energy used is stated in terms of calories per hour for each pound of body weight. The energy used for each form of activity is expressed in terms of percent over the energy used in lying still. Sitting required 30 percent more energy than lying down. Standing requires 38 percent more. Walking at 3.75 miles per hour gives an increase of 290 percent. Correct body use and posture are emphasized by the use of fourteen drawings that show the right and wrong posture of activities performed in the home. Two drawings show maximum and "easy" reach and one chart illustrates the recommended practice of resting 10 minutes out of every hour. The posture charts are based on research findings.

(Grady, Ethyl Rathbun, Illustrative Material for Correct Working Arrangements and Good Postural Practices in Homemaking Tasks, Master's Thesis, Kansas State College of Agriculture and Applied Science, Manhattan, 1950)--The author found as a home economics extension worker that homemakers seemed unaware that fatigue and minor ailments often result from poor postural practices and frequently are induced by incorrect working arrangements. Adequate illustrative material was not available to develop this subject with rural homemakers who were or will be building or remodeling their kitchens. This study was aimed to fill this need. Research literature was reviewed to find women's preference in heights of working areas and for working arrangements. Energy and fatigue reactions were also obtained. These data were checked against findings obtained from 135 young women enrolled in the "House" course at Kansas State College. Literature was reviewed and then conferences were held with physical education faculty from Kansas State College and Columbia University School of Nursing, New York. These conferences were held to assure accurate interpretation of correct postural practices and correct body mechanics. Thirty-eight plates, 21 of which are photographs, are provided. Five plates illustrate the correct working heights for various household tasks. The other photographs illustrate correct posture, working levels, comfortable reaches, points to consider in cupboard storage and arrangement and correct body alignment for stooping, lifting, pushing and relaxing. The author summarizes that home economists and physical education specialists have demonstrated that there is a relationship between correct working arrangements and correct body mechanics and both contribute to lessening fatigue in homemaking tasks. Personal experiments with various arrangements are the only successful guides to correct choices of working arrangements. The author found that the preferences of the Kansas State College women

were similar to those of a previous Oregon-Washington study in preferences for working arrangements. Incorrect postures and incorrect body mechanics are factors in producing strain and tension, resulting in fatigue.

(Seidelin, Gerda, M.D., Pathology and Hygiene of Housework, A Symposium, Part I, Journal of the American Medical Women's Association, Vol. 6, January 1951)--The author makes this report from material received in answer to questionnaires, original surveys and articles. The questionnaires were concerned with the diseases common to domestic workers and with means of prevention. Thirteen countries contributed answers. The answers were submitted by doctors of medicine. The answers indicate a definite relation of disease in women to too much standing, walking and inadequate kitchen structure, with work being done at work levels of incorrect height. Psychological trouble was felt to be caused by a feeling of incompetence, hence a need for teaching improved methods of doing housework. Unnecessary work also gives cause to frustration and dissatisfaction and this leads to feelings of tension and fatigability. Several of the doctors stressed the importance of sitting when doing housework. Dr. Seidelin lives in Denmark.

(Muse, Marianne, Seating Housewives at Their Ironing, Experiment Station Bulletin No. 559, University of Vermont and State Agricultural College, Burlington, February 1951)--This publication reports an investigation conducted with the aim in mind of finding out about the best equipment to use for the seated worker and to study posture, types of motions and classes of muscles for the best results and satisfactions for the seated worker. Twenty-five housewives cooperated in the study. The results of the study showed that all of the women, after they had completed the experiment, would rather sit than stand while ironing. They were more comfortable, expended less effort, became less tired and ironed fully as well as when they stood. The author names ironing as the most tiring task of many housewives and feels that women stand while ironing because they do not realize the importance of conserving their energy and preventing unnecessary fatigue, nor do they understand the extent to which sitting can accomplish this. They do not sit too because their equipment is unsuitable for sitting. It is necessary for the worker to have a suitable chair, ironing board and a well designed light weight iron. The chair and the board should be correctly related to each other in height. This bulletin gives the necessary information needed to select the correct equipment for seating housewives at their ironing.

(Bratton, Esther Crew, Let Your Body Work For You, Kelvinator Kitchen, Detroit, May 1951)--This article deals with the importance of good posture and proper use of the body in housework. Your own body constitutes your most important item in household equipment. It is well to acquire understanding of how the body functions in work and to develop skill in using the body effectively. Good posture is the basis for effective use of the body in housework. The alignment of the major body weights is good posture from the appearance aspect but it is also good body mechanics. We can make work easier if we keep the main body section, the head, the chest and the pelvis or hip sections, in alignment as much as possible. A second rule for comfortable performance is to hold any

object you lift or carry as close to the body as possible. The energy costs of lifting parts of the body are high. An example is that it requires 19 times as much energy to reach three inches from the floor as to reach to a 46-inch height. We can take some of the work out of housework and at the same time make it better exercise if we keep the three body weights in as straight a line as possible. Use the large muscles and bones in preference to the small ones when possible and work rhythmically.

SECTION IV

WITH REFERENCE TO FATIGUE AND THE CARDIAC HOMEMAKER

Fatigue is so much a part of every aspect of work simplification that it may seem that this special classification is not justified. However, it is because of the special importance that fatigue has for the person with heart disease that all the understanding possible should be obtained. The doctor warns the patient to be alert to signals of fatigue. She is given definite activity restrictions. In turn these restrictions can easily result in emotional tensions, feelings of futility and even fear. With an understanding of the many aspects of fatigue one can better understand the problems of these cardiac homemakers.

The most usual viewpoint concerning fatigue has been the one commonly considered in industry; that is, that fatigue results from physical effort. Two of the group of the five abstracts in this section touch on this prevailing concept. The other three reports deal with the newer concept, that fatigue is an expression of disorganization of the whole person. Two of these articles report on different aspects of one study conducted at Michigan State College where this hypothesis was tested in its relation to housework.

(Ryan, Thomas Arthur, Work and Effort, The Ronald Press Company, New York, 1947)--This book provides a systematic survey of psychological investigations concerned with productivity of men and women at work. Among the problems treated are: training and learning, control of accidents, establishment of pay levels for various jobs and the design of efficient methods of work. Motivation of the worker is considered in its relation to problems of efficiency. The book presents conclusions drawn from research in various fields and also attempts to acquaint the reader with methods of research that lead to the findings set forth. This publication is written for supervisors, managers of industry, teachers and workers who have interest in the productivity of man. In the chapter on measuring the cost of work, the author concludes that as for measuring fatigue as an element in the cost of muscular work, decrement of performance in highly motivated workers is still the only useful indicator. This has its drawbacks when applied to a practical setting because of the variation of motivation. But research has not yet provided any adequate bodily test for determining the degree of fatigue resulting from a given task. He uses the term sedentary work instead of the common term mental and in his chapter "Fatigue in

Sedentary Work" he stresses the need for research and the need for new procedures for testing fatigue.

(Bartley, S. Howard and Chute, Eloise, Fatigue and Impairment in Man McGraw-Hill Book Company, New York, 1947)--This work grew out of the recognition of the need for a consistent and comprehensive view of fatigue. Fatigue and impairment are not identical. Impairment refers to specific tissue conditions of the individual. It is a physiological change in the individual which reduces his ability to function organically. Fatigue is an experience of the whole person. Fatigue must be considered in terms of the whole person and does not depend crucially on energy expenditure. Neither fatigue nor impairment can be measured in terms of work output. The critical determination of fatigue is organization. The authors discuss personal factors in the work situation such as visual performance, sleep, conflict, frustration and other, to point out that fatigue is an over-all state of the person. The book reviews the kind of formal studies that have already been done under the name of fatigue, discusses general methods and procedures for finding the things that we need to know about fatigue. In the past no clear cut distinction has been made between fatigue and impairment. To study fatigue we should utilize common experience as a starting point.

(Ries, Estelle H., The Conquest of Fatigue, Hygeia, February 1950)--Fortunately the most trifling readjustments can often eliminate much fatigue from daily life. New equipment does not mean it is right for you. Such things as feet not touching the floor when sitting, having a work table the wrong height for comfort, poor light, stale air, noise, unsuitable clothing and poor organization of materials and equipment are causes of fatigue for the housewife. Repetition of motion, overeating, undereating and overindulgence in stimulants and narcotics are other causes of fatigue. Another factor is too much haste. In physical fatigue a by-product lactic acid cannot be removed as fast as it is produced. This brings about a toxic condition known as fatigue.

Rest periods are valuable during the day as they give the body a chance to remove these poisons. Frequent rest even before you feel tired will enable you to accomplish far more. Physical fatigue is healthy and is seldom dangerous but emotional fatigue is generally regarded as insidious. We do not generally distinguish from psychologic and physical fatigue. An important part of one's treatment for fatigue is frankly psychological. Rest will cure physical fatigue but in psychologic mind cure is needed. We must consider our individual ups and downs in energy and plan work accordingly. The author feels that the methods of conquering fatigue are extremely varied and it is part of wisdom to consider them all.

(Gross, Irma H., Fatigue in Relation to House Care, Journal of Home Economics, December 1950)--The author states that one of the objectives of home management has been the avoidance or lessening of fatigue in homemaking activities. The universal assumption has been that it is desirable to cut down energy output because it was accepted that fatigue accumulated in the body perhaps quantitatively in relation to output of energy. Within the last few years a newer interpretation of fatigue has developed, that fatigue is different from body impairment and that it is an outcome of

certain forms of personal disorganization in the same category with anxiety. There is also confusion in popular thinking between local muscle discomfort and either fatigue or impairment. A research study was developed at Michigan State College in 1949 with 20 homemakers in the community. The specific purpose of this study was to investigate the development of fatigue during a two-hour period of related house care activities centered around weekly cleaning. Because of the small number of cases, little attempt was made to present statistical data but the subjective findings point to certain indications. Researchers found only a few indications of relationships between cleaning procedures and the state of fatigue. There were more indications of lack of routine and indecision in the group that felt great fatigue. The study points to the conclusion that orderly procedure with relatively few delays is linked with lack of fatigue. A similarity of the fatigue pattern in individuals indicates that each person may establish habits of fatigue in relation to specific jobs. The patterns showed no consistent development of fatigue from beginning to the end of the work period nor could the reduction in fatigue after short rest periods be explained on the basis of energy renewal. This study that gives the fatigue patterns of 20 cases links them with a few variables and then obtains the worker's expressions of feeling of fatigue, supports the view that relatively few household tasks expend enough energy to cause a high degree of fatigue and there must be some other explanation of tiredness.

(Gross, Irma H. and Bartley, S. Howard, Fatigue and House Care, Journal of Applied Psychology, Vol. 35, No. 3, June 1951)---This article is a report of a study conducted at Michigan State College with a group of 20 homemakers. The aim of the study was to determine the occurrence of fatigue when doing weekly cleaning. The study was based on suppositions supporting recent conclusions of certain students of fatigue that fatigue is an expression of certain forms of disorganization with reference to activity rather than a result of physical effort. This interpretation implies a personalistic viewpoint. The results of the study showed that there was a positive relation between fatigue and other factors that were suggested by finding the subjects' attitudes. Those who became bewildered by clutter, those who found making decisions difficult regarding what to do next and those who had a general distaste for the job were the ones who became tired. The authors feel that it is practical to study fatigue from a non-energetic viewpoint.

SECTION V

VISION AND ITS BEARING ON THE PROBLEMS OF THE CARDIAC HOMEMAKER

Household equipment texts, educational divisions of public utility companies, manufacturing companies and college extension services have stressed the importance of adequate lighting as it relates to the well-being of the individual. As a result of these educational programs and the stress these programs have placed on the relation of the act of seeing to fatigue and the use of energy, questions are often asked about this. Few reports of research were found and, of those found, only three seemed to fit into this type of a study. In a college text book, Household Equipment by Louise Peet and Lenore Sater Thye, this

quotation by Dr. I. B. Motzger, former president of the Pennsylvania State Board of Medical Education, is given: "Twenty-five percent of our energy is consumed in seeing with normal eyesight and proper illumination." An effort was made to find the research on which this statement was based but no such research that measured energy used in seeing could be found. Many references to the relation of fatigue and seeing were found and there seems to be little doubt that quantity and quality of light have a direct bearing on fatigue. For this reason the importance of good or adequate light should be the concern of those working with cardiac homemakers.

The first article in this section is given in full as it is an unpublished statement by Dr. S. Howard Bartley, an authority on the psychological aspects of vision. Two other articles are included that are typical of the type of literature being made available by commercial research organizations as a part of their educational lighting programs.

(Bartley, S. Howard, Vision and Fatigue, Unpublished Statement, Professor. Psychology East Lansing, Michigan, February 1952)--All task activity leads eventually to results which we wish to avoid. Tensions develop and interfere with the most efficient and most comfortable performance. Activity is more surely to bring about these results if prolonged, because effects of disorganization of performance are cumulative. The same total of activity of a given sort will lead to less of the undesirable if broken into short periods than if continued in one stretch. Rest or change of task is thus primarily for the purpose of the reduction of tension and for the dispelling of the disharmony. The change, whether it be rest or the shift to another form of activity, thus reverses certain processes and gets rid of more or less disorganization. Breaking task activity up into short periods provides for the body processes that are working toward tension and disharmony to become reversed before proceeding very far.

The activity of restricted mechanisms within the body, such as that of the visual apparatus, does not remain well localized, particularly in prolonged tasks. It begins by involving the strictly local mechanisms but gradually comes to include others. The muscles of face, neck, back, etc., eventually become involved as is evidenced in the marked tensions that are set up in these areas. These "secondary involvements" are not only useless in accomplishing the task at hand but definitely contribute to the disorganization we call fatigue.

Whatever involves the uncomfortable use of skeletal musculature includes, to some extent, the autonomic nervous system and circulation. This involvement is often of a kind that is disadvantageous to individuals for whom it is necessary to keep circulatory function at an even keel and for whom the minimization of effort is imperative.

Seeing, as represented in the mere activity of the visual apparatus; that is, the eyes, and the neural pathways to the brain, involves the expenditure of little energy. The use of the eyes leads one into so much else that is energy consuming that often times advice is given regarding vision as a strenuous

activity. It seems simpler and more effective to advise regarding the limited use of the eyes in certain kinds of tasks than to say "don't" to the unfavorable behavior that is set up in the visual performance. For purposes of clarity, however, it behooves the sophisticated person to distinguish between vision itself and all that becomes initiated and guided and maintained by sight.

Emotional reactions are often part of visual observation. In this way, activity of the autonomic nervous system is altered or heightened, and with this goes changes in circulatory activity. Blood pressure elevation and vasoconstriction are common. When these results are to be avoided, it is obvious that visual tasks or situations inducing them should be avoided.

(Luckiesh, Mathew, Important Concepts Underlying Lighting for Critical Seeing, Lighting Research Laboratory, General Electric Company, Cleveland, 1948)--The material published in this leaflet was presented in a paper to the conference of the Illumination Engineering Society, Boston, Massachusetts, September 1948. The aim of the author in this paper was to isolate and clarify certain concepts upon which adequate lighting practices must be founded. Light and vision are tools for the performance of seeing. Vision deals only secondarily with light, strictly it is confined to the visual sense which can be considered as a tool just as light is a tool. It can be sharpened with eye-glasses if necessary. Eyesight specialists care for the eyes and determine visual efficiency just as a tool-maker sharpens and repairs his tools. However, people with normal vision when performing many tasks under prevailing levels of illumination have subnormal vision. This type of subnormal vision is just as real as the kind treated by the eyesight specialist. Because of this fact in countless tasks light and lighting can contribute much by increasing the brightness-level of the task which in turn elevates the visibility-level. Putting this in terms of the concept of industry, good lighting eliminates useless work, even if it is less obvious to measure as it is represented in terms of friction and internal loss. Visibility-level can readily be measured and light can then be provided to raise the visual object or task to a reasonable visibility-level. As knowledge progresses, measurements of visibility-level will probably be correlated more and more with the degree of ease of seeing. Lighting specialists have been greatly enriched by advances in efficiency of light-production, efficiency of light control and by a variety of new light-sources. If they will apply these tools with adequate comprehension of the basic concepts and utilization of knowledge already available, they have great opportunity to promote human efficiency, comfort, welfare and happiness.

(Luckiesh, M. and Moss, Frank K., The Effect of Visual Effort Upon the Heart-Rate, Journal of General Psychology, Vol, XIII, 1935)--Since the heart responds to numerous physiological and psychological stimuli, it is possible that the expenditure of human energy in critical seeing may be revealed or indicated by changes in the heart rate. The research reported in this publication involved an investigation of this phase of physiology by means of direct quantitative measurements of heart-rate. The specific objectives of the research were to determine the relationships, if any, between the heart-rate and (1) the duration of visual effort and (2) the intensity of illumination under

which the task was performed. Although respiration or basal metabolism may be considered more directly interpretable, the simplicity of heart-rate favors the use of this criterion. Reading was selected as a task because of its advantage as a universal and uniform problem. The reading matter chosen was The Outline of History by Wells. Seven male students, varying in age from 25 to 35 years, were the subjects. Each subject was instructed to read at his normal rate, begin at the first of the book and progress steadily through it. During the test period the reader was alone in the room separate from any recording apparatus. Physically, the conditions under which the reading was done were as comfortable as possible. All subjects were in good health and possessed normal vision. Each subject completed a series of twenty 1-hour tests. The tests were conducted at intensities of illumination of 1 and 100 footcandles respectively. The heart-beat was recorded by means of a cardiographometer adjusted to operate only upon the R phase of the pulse-curve. The important fact revealed by these data were (1) that the heart-rate progressively decreased as the duration of the visual task increased and (2) that this decrement in heart-rate was much greater under 1 foot candle than it was under 100 footcandles. Three charts showed graphically these results. Interpretations and explanations supplement this statistical material. The fact that a relatively large depression in heart-rate was observed under the lower intensity of illumination, but not under the higher, can be interpreted as indicating that the sensory processes were abnormally taxed in the former case. Emphasis is placed on the sensory rather than the mental phase. This is done as it is reasonable to assume that the latter is not a variable in this study. In general, the purpose of this study was to extend knowledge of the physiological effects of critical seeing and to aid in determining the optimum conditions for seeing but the results may also have significance when interpreted for anomalous pathological cases.

SECTION VI

RESEARCH STUDIES OF SPECIFIC HOUSEHOLD ACTIVITIES

Homemaking is made up of a highly varied combination of activities that are usually carried out in an inter-related pattern of procedure. Hence, it is difficult to find single household activities that are concise enough in their limits to be studied as single units. For this reason few such studies have been done. Those that lend themselves well to this type of consideration are dishwashing, bedmaking and ironing. The type of research study reported in this section should point out the fact to the teacher that there is no "one best way" to perform any household task. Class members should be trained to receive suggestions and recommended techniques with this in mind and should be encouraged to be constantly alert, looking for improved methods that will work best for them with their particular set of conditions. The teacher who uses this approach will find that a valuable part of the class program will be sharing by the class members of the improved work methods that they have been able to develop.

The four research studies reported in this section show a variety of methods of job analysis that can be used in developing improved techniques for housekeeping tasks. Three of these studies deal with dishwashing and the other study reports on two improved methods of bedmaking.

(Heiner, Mary Koll and Vedder, N. Maude, Studies in Dishwashing Methods: An Attempt to Apply Methods of Job Analysis to a Household Process, Journal of Home Economics, Vol. 22, 1930)--The authors apply the methods of industrial job analysis to dishwashing. They first attempted by interviewing one hundred homemakers to set up a standard for the usual method. Then to make an analysis they used stop-watch timing under carefully controlled conditions. Six units of operation were observed and from these observations 1954 motions requiring 38 minutes and eight seconds were established as an average for handwashing. By working out an improved method, without changing equipment, motions were reduced to 1,008 motions and 22 minutes, 38 seconds of time. By washing in a stationary dishwashing machine once a day, motions were reduced to 1,015 with 22 minutes, 31 seconds time. Some of the improvements used to reduce the motions and time for handwashing were: washing dishes once a day instead of three times, allowing dishes to air dry instead of drying by wiping with a towel, and the adoption of "convenient storage." In the comparison of handwashing and machine washing, the authors feel that the results they obtained do not give a complete answer. Measurements of fatigue and psychological reactions should be included. A fundamental requirement in arriving at methods of least waste of energy and time is willingness to break with traditional methods of work.

(Nelson, Gladys, A Study of Dishwashing Methods from Right to Left and Left to Right by Means of Micromotion Analysis, Master's Thesis, State College of Washington, Pullman, 1947)--This study was set up to determine whether the direction of working had significant effect on the efficiency of dishwashing measured in terms of time and motions. Techniques of dishwashing were studied to determine the acceptable methods to use for this study. Process charts, micromotion and simo-charts were used. These results plus findings of past research were considered by a committee of specialists and the most acceptable methods were selected. Some of the selected techniques were: when washing glasses allow the left hand to rotate the glass while the right hand manipulates the dishcloth; five pieces of silver were the best number of pieces to manipulate and yet wash thoroughly at one time; plates were turned over by wrist action to wash underside without changing position of fingers; a smooth round swipe was the movement accepted for washing the plates; and a large mesh dishcloth was selected for this method instead of a mop. Immersion in water of 170 degrees fahrenheit for 2 minutes was selected for even drying and an effective measure of sterilization. Spray rinse was eliminated because of resulting streaks. Silver and glasses were washed, rinsed and dried before other dishes to alleviate overcrowding the drainer. Silver and glasses were dried by a towel; all other dishes were air dried. Final recommendations are: glasses and silver should be placed in water at same time using left hand for glasses, right hand for silver; establish a definite pattern of routine for washing and drying silver and glasses and washing china, then practice this until it becomes a habit; use both hands whenever possible. Dishwashing saves more time and motion

when dishes are washed from right to left so sink units should be planned with this in mind. Sinks combining a shallow and a deep tray would be desirable as dishes are rinsed more efficiently in a deep rinse. The best method to rinse is to place dishes in a drainer and dip the drainer in the hot water, removing it with the dishes remaining in the drainer. From the results of this study an improved method of dishwashing should be developed.

(Goble, Eva Lenora, Work Simplification in Dishwashing, Master's Thesis, Purdue University, Lafayette, June 1947)--The purpose of this study was to determine methods most commonly used in dishwashing and to find ways of improving these methods. From a survey of 278 women, five most commonly used methods were selected. Films were made of these methods and micromotion analysis and time studies used to study these methods. From these, two new methods were evolved, one for a sinkless kitchen and one for a sink equipped kitchen. All motions that had shown themselves economical in any of the methods observed were incorporated into these new methods. These new methods were observed and analyzed. Principles of motion economy that were developed for dishwashing were: wash dishes at level of water to eliminate carrying water on cloth to the dish; wash dishes with a circular movement; keep dishcloth in the right hand except when reaching for soiled dishes; and preposition the next item to be washed by hand, holding the cloth while the other hand is returning from depositing the last dish washed. The author concludes that actual handling of dishes by the sink method is not superior to the two-pan method used in a sinkless kitchen but time is saved by the sink method (23 percent) in the collecting and putting away equipment and in getting the water. The fewer pieces of dishwashing equipment used in the sink, the less time is used. The design of the sink, the depth of the basin and the height of the cabinet in relation to the worker affect the motions used. Bacteriological examination showed that a hot pour-over rinse of 192 degrees Fahrenheit yielded dishes within the United States Health standard four times out of four. When dishes were rinsed under the faucet with water 120 to 122 degrees Fahrenheit, the dishes met the above-mentioned standard one time out of four. There was no germicidal difference found between dishes washed with soap and those washed with a wetting agent. Some further conclusions quoted from previous studies are: dishes washed once a day and air dried save 30 percent of motions, 19 percent of the time (Heiner and Veddar); one worker is most efficient (Cushman); with limited space it is a little quicker to use an immersion rinse (Fitzsimmons).

(Muse, Marianne, Saving Time and Steps in Bedmaking, Experiment Station Bulletin No. 551, University of Vermont and State Agricultural College, Burlington, March 1949)--In this study the process chart, time measurements and measurements of distances walked were used to find an improved method of making a bed that will require the minimum of moves, operations, steps and time. Three subjects, who were housewives, cooperated in the study. Six methods of bedmaking were compared. Each of two housewives made the bed in their usual way and these were called method I and II. Method III, IV, V and VI were the new methods tried. Methods IV and VI were acceptable. The three subjects did not agree on the same method they would rather use. Method IV required only one trip around the bed whereas method VI required two trips, but took less time, and total

elements in the process of method VI were less. In method IV all the bedding was placed in position on the bed and each corner was completely made before proceeding to the next. In method VI the bottom sheet was placed in position first and then the rest of the process was the same as for method IV. The time was about the same but the steps were fewer when two made the bed. There were more total elements with two working but the value and pleasure of members of a family working together must be considered. The sheets were folded lengthwise and then in quarters lengthwise as they came from the laundry and were used in this form in all methods. The author feels that there is no best way to make a bed but that a person should try several methods and then select the one best suited to her conditions. This report shows ways of saving time and steps and it also shows how methods of doing any household job can be analyzed and improved.

SECTION VII

KITCHEN PLANNING

In the development of the Cardiac Homemaker's Program, a kitchen unit was planned that demonstrated the application of the principles of work simplification to kitchen planning. This has lead some persons to believe that the Cardiac Homemaker's program is one that is essentially kitchen planning. This is erroneous as kitchen is only a part of the program and the kitchen is used as a point of departure for teaching the principles of work simplification. The fact that the homemaker spends more time doing tasks in the kitchen than elsewhere makes this a logical procedure.

Popular magazines, architectural publications and college bulletins provide a wealth of material pertaining to kitchen problems. In this connection kitchen storage has been given special stress. In the work simplification section of this report, Section I, the bulletin Easier Homemaking by Mundel, is reviewed. This has an excellent section on kitchen plans and arrangements. New types of kitchen equipment create the need for studies such as the one reported in this section. Separate oven and cooking units for ranges suggest the need for studies to determine the best location of such units but the writer could not find any such studies. Three publications are surveyed in this group. One bulletin on kitchen planning is included because it was prepared and published after much research and, as a United States Department of Agriculture bulletin, it is easily obtained. The other two are reports of research done at Washington State College and show the application of time and motion techniques to the problem of location of basic kitchen equipment.

(A Step Saving U Kitchen, Bureau of Human Nutrition and Home Economics, Miscellaneous Publication No. 646, U.S. Department of Agriculture, Revised, April 1949)--This bulletin provides a floor plan, gives a description, photographs and drawings of the "U" step saving kitchen designed by J. Robert Dodge, architect. In most States the working drawings can be obtained from the extension engineer or the county extension agent. The department of Housing and

Households, Bureau of Human Nutrition and Home Economics, Beltsville, Maryland, will assist in directing one to a department within the State that handles these working drawings. In the plan offered in the bulletin, the three key pieces of equipment, range, sink and refrigerator, are brought within easy reach of each other. This plan is designed to cut walking, stooping, stretching, and to provide a production line going from right to left. Comfortable working heights, handy storage, adequate light and air are all given consideration. The kitchen is planned with a definite location for a mixing center, a vegetable preparation center, dishwashing center, cooking center, serving center and dining center. The main points essential are listed for each center and special features are described and pictured. The pull-out lapboard in the food preparation center is given special emphasis. This board is planned low enough to allow the worker to sit to work with a regulation height kitchen chair. This allows the worker to sit comfortably with both feet on the floor.

(Wiley, Elizabeth Weeks, A Motion Study of Kitchen Arrangements, Experiment Station Bulletin No. 518, The State College of Washington, Pullman, September 1950)--The purpose of this investigation was to compare the following arrangements of equipment as measured by the number of trips and steps required in preparation of the meal--serving, clearing away and dishwashing:

1. Placing of refrigerator adjacent to the food preparation counter vs. placing on an adjacent or opposite wall from the mixing unit.
2. Placing the sink unit adjacent to the mixing unit vs. placing on opposite wall.
3. Placing the sink unit adjacent to the mixing unit with the range on the adjacent or opposite wall vs. having the range adjacent to the mixing unit with the sink on the adjacent or opposite wall.

An improved method was arrived at by use of process-chart techniques and this was used in the preparation of a typical menu in six different kitchens. These kitchens were laid out according to plans perfected at the State College of Washington. They were classified as U-shape, broken U-shape and two-wall. This bulletin gives the floor plans of the six kitchens used and lists the supplies and equipment located in each of the similar units planned in each kitchen; sink unit, mixing unit, cooking unit and refrigerator. The results of the investigation were given in a series of graphic charts and tables. The conclusions drawn are:

1. It was found that there were many trips between the sink and mixing unit in all kitchens. The fewest steps per trip between these units were in the U-type, indicating good arrangement.
2. More trips were made between the range and the sink than between the range and any other unit. Thus the range should be located near the sink.

3. There was some traffic between the sink and the refrigerator when putting away left-over foods and setting the table. However, the relationship was not sufficient to conclude that these should be adjacent.
4. More steps were taken in fewer trips between the sink and table than between the sink and any other unit. In each kitchen most of the trips were taken when setting table and removing dishes to sink for washing. Therefore the sink, with stacking center to the right, should be located close to dining area.
5. There was an average of only six trips between the range and mixing unit. Therefore any arrangement of mixing center and range would seem satisfactory as long as they are only 4 to 6 feet apart.
6. In all kitchens two or three trips were made from mixing center to dining table and these few trips indicate this unit could be farthest from the dining table.
7. There was little relationship between the location of the range and refrigerator. There was a definite relationship between the dining table and range. The trips were taken while serving food. The broken U-type kitchen averaged the least number of steps. A serving counter adjacent to range and between it and dining area saved confusion and steps.
8. There was little traffic between the table and the refrigerator so the latter could be placed farthest from the dining area.

(Wood, Anna M., Ribelin, Shirley and Lange, Fay, Location and Counter Area Requirements of a Mechanical Dishwasher, Experiment Station Bulletin No. 526, The State College of Washington, Pullman, June 1951)--The increased demand for the mechanical dishwasher had introduced new problems in kitchen planning. The purpose of this study was to answer the question "should the dishwasher be located to the left or right of the sink and how much counter was required for stacking dishes in loading and unloading"? The study was divided into parts I and II. In part I the front-opening and the top-opening dishwasher, representing two general types of construction, were used. Time and motion techniques were employed in studying the location in relation to the sink, using a tape recorder to record the data. Two observers were used and nine college girls were chosen as operators. Process charts were made from the recordings. Findings did not indicate that one location was wholly better than another but location of the dishwasher at the left of the sink has some advantages as this reduced arm motions and steps. There was no appreciable difference in time and body motion. No decided advantage of one type of dishwasher was indicated. However, the front opening required fewer body motions for loading while the top opening required fewer arm motions for this process. Part II had, as its purpose, to determine the length of a standard 24-inch depth work counter required for stacking prior to loading a dishwasher and

required for unloading. Plastic forms to represent dishes were cut and used instead of actual dishes and these were placed on the different sized counters in an effort to find the needed counter area. It was found that when dishes were stored in the vicinity of the dishwasher 18 to 21 inches of counter space were needed when the counter was 24 inches deep. The top of a front opening dishwasher could be used if the operator did not have to reach over the open dishwasher. When dishes were stored in some other area, 33 to 36 inches of space were needed.

SECTION VIII

PUBLICATIONS WITH REFERENCE TO HANDICAPPED AND CARDIAC HOMEMAKER'S PROBLEMS

In the other sections of this report the research and other publications reported were selected from the field of home economics and other related areas. The selections were made with the idea that they were applicable to the various aspects of the problem of teaching work simplification to homemakers. Besides these there was a variety of publications that were found, touching in one way or another on the subject of the handicapped homemaker or providing some kind of information about the cardiac homemaker's classes. These are grouped together in this section for convenience rather than because they are similar in subject matter.

No publication was found that included an outline or course of study for cardiac homemaker's classes. Brief mimeographed or typed outlines were obtained that had been used for such classes of the St. Louis, Missouri Heart Association, the Washington State Heart Association and those used by the Michigan Heart Association in cooperation with Wayne University and Michigan State College. . Reports from the published news bulletins of heart associations and the parent heart association, the American Heart Association, is the authority for the statement of the fact that Michigan is the only State where the Cardiac Homemaker's classes have been carried on through the facilities of a university or college. In Michigan, Wayne University Home Economics Department offers classes to cardiac women in the metropolitan Detroit area and for those in the surrounding communities. Michigan State College has set up the program as a special project within the School of Home Economics through the Cooperative Extension Service of Michigan State College. These classes are offered as one of the home management projects that are available for the county home demonstration agent to select as part of the county home economics program.

There are seven articles surveyed in this section. Three of these deal with the cardiac homemaker's classes that are a part of the Michigan Heart Association's educational program. Two other articles are aids to teaching cardiac homemaker classes and are available through the American Heart Association. The same person is the author of the other two articles but each deals with a different phase of the problem of the handicapped homemaker.

(Heart of the Home, American Heart Association, New York, 1948)--In 1948 a "Heart" kitchen was constructed according to plans worked out by a sub-committee headed by Dr. Lillian Gilbreth. This pamphlet gives the floor plan for this kitchen. All features are listed and shown in a series of photographs. The aim of this publication is to encourage the homemaker to apply the practical suggestions in her own kitchen to help her save time and energy. This kitchen is not designed as a "model" kitchen but as a demonstration kitchen. Other information is included in the publication that deals with body mechanics, mental hygiene, the importance of moderate pace and general rules for persons with physical limitations to follow. The principles of work simplification are given with practical suggestions for their application to household tasks. Line drawings illustrate the different points covered. A motion study check list is included as an aid to applying work simplification to household tasks. This booklet was designed to help the person find easier ways of doing housework. The easier way is more pleasant and efficient and gives deep satisfaction. The emphasis of applying work simplification in the home and kitchen is put not on expensive gadgets or elaborate remodeling jobs but on applying the principles of work simplification to develop better work methods.

(Heart of the Home Program Kit, American Heart Association, New York, 1949)--The purpose of this kit is to provide material that will help heart associations to set up and carry through a community service program. The material is assembled in a convenient loose-leaf folder type of manila envelope. In the loose-leaf section are given steps for the setting up of the program, a fact sheet with a supplement, a list of program material that may be ordered from the national office, with prices and a list of supplementary, inexpensive teaching materials and the place to find them. A bibliography is also included. The front pocket of the kit contains: picture edition of Heart of the Home bulletin, Heart of the Home film flyer, Posture in Housework bulletin, suggested form letters, report forms, teaching plans of study and a work simplification report. The back pocket of the kit gives script for Heart of the Home slide film, an order form and a list of the State Extension Directors.

(Judson, Julia, Home Management Aids for Women with Physical Limitations, Master's Thesis, Ohio State University, Columbus, 1949)--The author selected 50 handicapped women; four were cardiac patients. These women were questioned to find out what jobs in the home they found most difficult and what body motions and actions they considered most difficult. The author then gives suggestions for improved methods that would save effort and reduce unnecessary motions for the handicapped. From the findings of the questioning, it was found that climbing stairs, stooping and reaching were considered most difficult for the heart patients and their greatest need was felt to be a one-floor house and a rearranged kitchen. The conclusion drawn from the study was that there was no positive indication of a definite relationship between a woman's disability and the activities she felt were difficult. Time, motion and energy saving techniques can be applied to specific cases or general conditions. Handicapped persons must understand their limitations, evaluate present practices, weigh family values, make changes they can afford to make in tools and equipment and experiment with new methods and practice them. Rehabilitation programs should recognize

the problems of the handicapped homemaker. There is a need for coordination of doctors, social workers, design engineers and architects in making a contribution to the needs of the handicapped homemaker.

(Judson, Julia, The Physically Handicapped and Kitchen Operation, Kelvinator Kitchen, Detroit, January 1950)--The wide variation in the extent of disability or limitation, plus the individual's personal reaction makes each case different but the approach to the problem is similar to that of any home management problem with emphasis on the limitations imposed by the disability. Analyze the situation by asking what tasks or activities can be done safely; what should be avoided; what are the essential needs of the family for health and happiness; where does the family need the homemaker most; what jobs can be eliminated; who else can do them; what methods, equipment or working areas can be altered or adapted; and how much money is available for equipment or construction?

Kitchen operation is the area of homemaking that occupies more time and energy than any other except child care. Size of the kitchen, storage arrangements and working heights should all be given consideration in relation to the patient's disability. The foremost consideration is that the person should be comfortable. For sitting, the low chair is more satisfactory than perching on a high stool. Special care should be given to the relationship between the working surface and the seated worker. There is a need for adequate back support on all chairs and need for foot support when the high chair is used. Weight of cooking pans and mixing bowls should be kept in mind. Tables on wheels are indispensable for the handicapped. Careful planning of work to distribute heavy tasks throughout the week or day, as well as planning of individual tasks, is important. The saving of energy by using of short cuts in kitchen procedure should be tried and practiced. Techniques in manipulation of tools should be developed. The gross arm movements should be used when possible instead of fine finger motions. The foregoing suggestions only touch the high spots of working with handicapped in kitchen operation. Suggestions for time and energy management need special emphasis for the handicapped.

(Bielawski, John G., M.D., The Cardiac Housewife Program of the Michigan Heart Association, The Journal of the Michigan State Medical Society, Vol. 49, December 1950)--As executive director of the section on Occupational Cardiology, Michigan Heart Association, the author reports the development of the cardiac housewife program in Michigan. The cardiac housewife program is designed to be of aid to the physician in the management of his cardiac housewife patients. One of the very important factors in the treatment of ambulatory cardiac patients is teaching them to limit their activities. For the housewife, the physical effort expended can be greatly reduced by application of work simplification methods. Practical courses teaching these work saving methods are now offered as a community service by the Michigan Heart Association. The first classes were offered to cardiac women in the Detroit area and were taught at Wayne University in cooperation with the Home Economics Department. Classes are now being organized for presentation throughout the State in cooperation with the School of Home Economics at Michigan State College.

(Sanderson, Frances G., Improving Work Habits of the Cardiac Homemakers, Kelvinator Kitchen, Detroit, June 1951)--This report tells of the cooperative program developed cooperatively between Wayne University and the Michigan Heart Association. The interest in this program developed when Dr. J. G. Bielawski, Occupational Cardiologist for the Michigan Heart Association, attended a convention in New York. He became familiar with the "Heart Kitchen" developed for the New York Heart Association under the direction of Dr. Lillian Gilbreth. When Dr. Bielawski returned to Detroit he contacted Mrs. Sanderson, Chairman of the Department of Home Economics, Wayne University, Detroit, and the first step of their plan was worked out. This was a trial study on one cardiac patient. Many visits were made to this patient and results of this study were recorded by photographs and diagrams. A six-month pilot study to investigate habits of the cardiac homemaker was set up and two more patients were obtained to cooperate. The results of this study brought about the establishment of classes for cardiac homemakers. These classes were conducted in the home economics laboratory at Wayne University. These classes were financed by the Michigan Heart Association so were free to the women attending. Each patient attended three class meetings and the class group numbered from 16 to 20. The program of the three classes included: getting acquainted, demonstration of easier methods of doing some tasks and sharing of experiences by class members. The class members worked in small groups and reported on the progress they had made. The class members have reported that laundry work is one of their most tiring activities. The aim of the class teaching is to provide the patient with the "know how" to take it easy. The goal is to help each cardiac to live a more normal satisfying life by learning new habits of work.

(Houts, Marion Tate, Application of Work Simplification Methods to Specific Allowed Activities of the Cardiac Homemaker, Master's Thesis, Wayne University, Detroit 1951)--This thesis describes the cardiac homemaker's program initiated in Michigan in 1950. The Michigan Heart Association cooperated with the Home Economics Department at Wayne University. The basic principles of work simplification and methods of applying them were selected from literature. A report was made of the pilot study done with three cardiac homemakers. This study included observations of the old methods the homemakers used in doing their work with time recordings, estimated energy consumed and audio-video recordings. Judged subjectively, the new methods used resulted in increasingly better health, reduction of fatigue, improved morale and new allowed activities. Classes for cardiac homemakers followed this pilot study and the class outlines of the subject matter taught and the class procedures were outlined in this report. The author concludes that teaching of work simplification is not only of benefit to the physically handicapped homemaker but to all homemakers. Changes can be effected with minimum cost. No homemaker is aware of the great energy saving possible until she subjects her habits to critical examination. Then she must possess a positive approach to change.

SECTION IX

THE HEART, HEART DISEASES AND TREATMENT

This material is chosen from the current or popular field because it seems only necessary to be informed in a general way on this subject. This area of information is definitely the subject matter for the doctor only to discuss in any way whatsoever with the cardiac patient. The work simplification representative, however, should be informed as to the function of the heart, how it works and should have some basic information concerning the general problems of heart disease. She should know something concerning the various types of heart disease and the prevalence of each as well as the symptoms and general methods of treatment. From this section of reading, the most significant points for the teacher to absorb are the general optimism that is shared by doctors working with heart patients as to the many possibilities for reducing suffering and deaths from heart disease and the viewpoint that limited activity is not only permissible for many persons suffering from heart disease but in some cases even beneficial. This knowledge gives the teacher a positive and confident approach in her teaching. Her problem then becomes how to teach the cardiac homemaker, the best way of using this allowed activity so that it will give the patient the greatest amount of value to herself and to the members of her family.

In the final section there are seven articles surveyed. With the exception of one article that is an explanation of how the heart functions and one other brief quotation from the Science Digest, all the material was made available through the Michigan Heart Association. For this reason, the writer feels that it expresses the viewpoint commonly shared by those who are best informed about heart disease and its treatment.

(Bay, Ernest B., M.D., Some Aspects of the Non-medicinal Management of Heart-Disease, The University of Chicago Round Table No. 517, February 15, 1948)-- This paper is part of a special supplement on heart disease. The author discusses psychosomatic medicine in relation to the heart patient and the early ambulation or activity of convalescent patients. He states that while it is desirable that patients with serious heart trouble refrain from activity producing serious symptoms, it is increasingly evident that patients with all forms of heart trouble should be active almost to the limits of their capacity. This amount of physical activity should be prescribed by a competent physician on the judicious evaluation of several factors. On the whole it is better to err on the side of optimism rather than pessimism when giving advice about exercise. There is an interrelationship of greater or less importance between the physical and mental activities of patients with heart disease and many patients have been largely disabled by virtue of cardiac neurosis. Dr. Bay concludes that in the care of patients with heart disease, detailed attention must be given to their schedule of physical activities and their emotional responses to their illness.

(Blakeslee, Howard, Know Your Heart, Public Affairs Pamphlet No. 137, The American Heart Association, New York, 1948)--This pamphlet gives the trend of heart disease as a cause of death, with the present rate of 600,000 deaths per year and the possible increase to 1,200,000 by 1960. This rise is related to the present rise in age of the American population but emotional and mental strain of modern living also contributes to this high death rate. The author describes the heart as the strongest and toughest of all vital organs. Its functioning is described and drawings are used to aid in this description. Heart diseases are listed. There are 21 varieties but the major forms of heart trouble are rheumatic heart disease, high blood pressure and coronary heart disease. Each is described. Then the author lists another type that he calls "functional" heart disorder. This is possibly the most widespread but with this there is nothing wrong with the heart machinery and it never kills. The fear of heart disease is a disease in its own right because of the worry and suffering it can cause. Evidence indicates that there is no occupation or trade that is a dominant factor in causing heart disease but the way of life seems to be an important influence. The two lines of attack in dealing with the problem of heart disease are treatment and prevention. A completely restored heart does not happen often but partial recovery in the sense that a person can often live a comfortable, happy, useful and often a long life is frequent. Prevention of certain heart troubles is moving ahead. In high blood pressure and coronary heart trouble, the prevention does not reach the original causes but only the after effects; Hyperthyroidism and syphilis can be prevented. Heart disease is a tough nut to crack but in the last 30 years the medical profession's scientific organization has developed an international, medical, social, public, legislative, State and Federal drive to lengthen life.

(Katz, Louis, M.D., A Survey of Recent Developments Concerning the Concepts of Coronary Disease and its Management, University of Chicago Round Table No. 517, Chicago, February 15, 1948)--This paper is part of a special supplement and discusses the various kinds of coronary disease, symptoms and treatment. The treatment of coronary diseases involves more than medication. We should view with grave suspicion any tendencies to impose on the patient undue prohibitions. The patient should keep himself fit by a program of graded exercise. Exercise should be indulged in up to the point of tolerance. Inactivity even makes a healthy person physically unfit. Rest is an important item (or even a nap) as it breaks the tension of the patient. The patient should be moderate in his work or undertakings. He should learn to slow up, how to cut down and avoid peak loads and develop a carefree attitude. He should keep his weight down to normal. There is a psychological fear that all lay people and too many physicians attach to coronary episodes. We should practice the psychology of hope.

(Robinson, Henry Morton, The Heart, Wondrous and Courageous Organ, Readers Digest, February 1948)--The author describes the action of the heart in a very understandable way with an accompanying diagram to aid the reader to visualize the way the heart functions. The heart is described as a pressure pump which forces the blood with its freight of oxygen, food or waste through the vessels of the body. Driven by the heart, the five or six quarts of blood make a round-trip about once every minute. In 24 hours the heart receives and pumps out again some 10,000 quarts of blood and expends enough energy to raise a 150 pound man

to the height of the Empire State Building. The rest for this muscle is only the brief pause between the "dub" and the next "lub" but by this method it spends twice as much time relaxing as it does at work. The heart is about the size of the fist of the person and a kind of electrical timing apparatus called the pacemaker normally generates 70 times a minute a tiny electrical impulse that causes the muscle fibers to contract. In this article the author traces the course of the blood through the body, describing the function and action of each part of the heart.

(White, Paul D., M.D., Good News About Your Heart, Reprinted from This Week magazine, The American Heart Association, New York, 1949)--This article discusses heart disease with the idea of preventing unnecessary worry and fear for those who have a heart condition. The author discusses new techniques in treating heart patients and says that when a heart does behave abnormally, it is not always dangerous but when a patient does have a major heart disease he has to modify some of his habits, the amount depending on what he is suffering from. The idea that a person has to stop all work is wrong. Moderate activity is just as necessary for a heart patient as for anyone else. The dread of climbing stairs is another fallacy. Actually, walking upstairs is not harmful so long as you do not run and as long as you do not place such a strain on your heart that failure might occur. For the healthy person who wishes to avoid heart disease, a moderate amount of activity is always important but that does not mean overdoing it. Moderation and relaxing are stressed and keeping the weight normal.

(White, Paul B., M.D., Facts and Fancies About the Heart, Life and Health, Part I, November 1950; Part II, December 1950)--The author states that the heart is the most efficient muscle in the body. It is practically impossible to exhaust a healthy heart as muscular and nervous fatigue and collapse occur first and protect the heart. There is much apprehension concerning the heart that needs to be dispelled. The usual pulse rate is from 50 to 90 per minute but a heart can function for years at as rapid a rate as 120 to 150 beats. Low blood pressure as low as 90 to 110 in an adult should not cause concern as it can actually lengthen life. Heart disease is not one disease but several. Less frequent but more complicated is congenital heart disease. The second important disease is rheumatic heart disease. This usually allows recovery with some permanent heart damage, variable in degree. Important new advances have been made in the treatment of rheumatic fever and rheumatic heart disease. Hypertensive heart disease seems related to our modern way of life. Heredity may play a role as well as kidney disease in some cases. Reduction in weight, slowing of pace, as well as treatment with new drugs are used as treatment. A type of nerve surgery is sometimes used as well as a low fat and salt-free diet. Coronary heart disease comprises one-fourth of all heart disease. It often starts with brief attacks of angina pectoris which may radiate down the left arm. These first attacks start with over exertion and later attacks occur when the patient is at rest. Narrowing of coronary arteries ultimately leads to a blockage and clotting of blood in the small artery. This may end with sudden death. Early hardening of the arteries is responsible for coronary heart disease. Once the heart is affected with heart disease it does not mean

permanent trouble ahead. Heart symptoms do not mean heart disease always. X-ray and electrocardiogram are not conclusive but they are valuable tests. Heart murmurs must be analyzed with care. Usually the loud murmurs are the least important. Leisurely climbing of stairs can be undertaken except when there is heart failure.

(Leaman, William G. Jr., M.D. Normal Life for Heart Patients, Science Digest, February 1951)--This article republished a report appearing in the Philadelphia Bulletin. Dr. Leaman Jr. spoke before the Interstate Postgraduate Medical Association of North American. He said that complete inactivity is as dangerous as doing too much for the heart patient. It has been shown that over 70 percent of patients attending heart clinics can perform useful and productive work.



The low ironing board permits the homemaker to sit while ironing but the high ironing board is more convenient for a person on crutches.



